

Municipal Journal

Volume XLII

NEW YORK, MARCH 15, 1917

No. 11

CATCH BASIN CONSTRUCTION AND MAINTENANCE

General Forms, Materials, Traps and Inlet Openings Employed in Several New England Cities—Methods of Cleaning by Hand and by Machine—Concrete, Stone and Iron Tops.

A topical discussion on the subject of catch basins was held by the sanitary section of the Boston Society of Civil Engineers a few weeks ago, which was opened by George A. Carpenter, city engineer of Pawtucket, R. I., and contributed to by eleven other city engineers or sewerage officials and three consulting engineers.

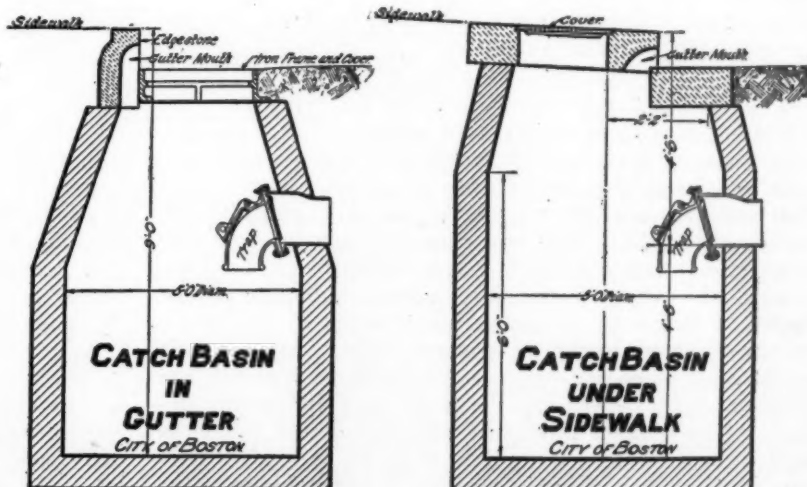
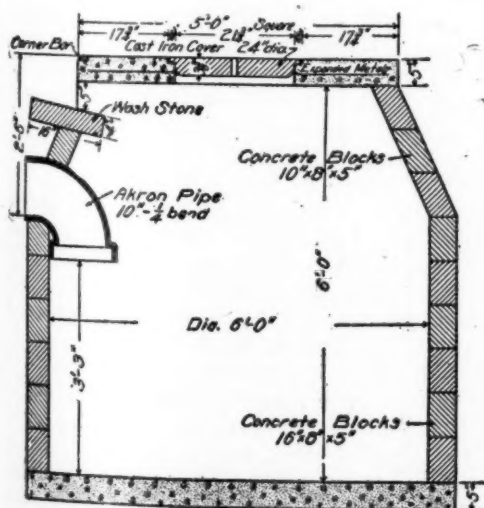
Although Mr. Carpenter introduced his discussion with a reference to the difference of opinion as to whether catch basins or plain inlets are preferable, this phase of the subject received very little attention in the discussion, practically none of the speakers even referring to the subject, except Frank A. Marston.

Mr. Carpenter's introductory paper dealt largely with the method of cleaning catch basins. For several years he endeavored to discover some form of basin construction that would lend itself to better and more economical cleaning methods, or some more satisfactory way of cleaning the type of basin already in use. About four years ago employees of Pawtucket developed the idea of a power hoist on an automobile truck for lifting the material from catch basins, which device was described in Municipal Journal for the issue of November 6, 1913. This has been improved upon, and the contrivance now used consists of a Standard chassis with a 32-horsepower engine, carrying a steel body 9 feet by 4¼ by 2 1/3 feet high. Cover plates two feet wide are placed over each end to prevent the load slopping out. The capacity is 3.4 cubic yards and the average load carried has measured about 2.6 cubic yards and weighed about 3.4 tons. The tail board is hinged at the top to facilitate dumping and

is provided with a rubber gasket so that it can be clamped tight against the body. Dumping is effected by a hydraulic lift.

Back of the driver's seat are mounted two 6-inch "I" beams and on these is a 2-horsepower Fairbanks-Morse gasoline engine, cable drum and control mechanism. The cable runs to an outrigger which can be swung over the catch basin and back over the cart. (The 2-horsepower engine is to be changed to a 4-horsepower, as the former is found lacking in power for the heaviest work.)

The bucket first used was a plain cylindrical one, 14 inches in diameter and 17 inches deep, and was filled by hand by a man in the basin. Since November, 1913, an orange-peel bucket has been used. This was operated by oil under a pressure of about 100 pounds per square inch, but recent experiments have indicated that by using compressed air in place of oil, the time of loading can be materially reduced. Under the old method of cleaning basins, before the truck was used, the average time of loading was 40 minutes per cubic yard and the average time of hauling 3,500 feet was 35 minutes. When the truck was first put in operation with a bucket loaded by hand, the average output was 13 cubic yards per day of nine hours, which was increased to 23.4 cubic yards per day; and experiments with compressed air indicate that this can be increased to 31.2 cubic yards. In hauling the load, the truck has averaged eight miles or more per hour. Mr. Carpenter believes that with air in use the city will be able to average 2.6 cubic yards every 45 minutes delivered to a dump 1¼ miles distant, or an average



hourly output of 3,455 cubic yards. Allowing interest at 4 per cent on the cost of the truck (\$4,200), with depreciation and repairs at 20 per cent and a new set of rear tires every year and of front tires every two years, with labor at \$12 a week, gives a cost per cubic yard of 75 cents, as compared to \$1.80 under the old method.

As to the form of catch basin, the one used in Pawtucket has its bottom half practically the same as that used in most of the other cities, consisting of a circular well with a concrete or stone slab bottom, the well being 4½ to 5 feet in diameter and from 4 to 5 feet deep below the outlet. Practically all of the cities use some sort of trap over the outlet, the object of which is apparently more to keep sticks and other floating matters out of the sewer than to prevent the entrance of sewer gas; although the latter is considered, and in some cases special provision made for it. The Coleman trap was used in Pawtucket some years ago, but Mr. Carpenter finds that the inlet is small and so constructed that small sticks, leaves and other floating matter readily enter and often produce a complete stoppage; and when frozen slush enters a basin in winter, this form of trap is easily clogged and difficult to relieve. These objectionable features were partially overcome by the addition of a galvanized iron hood over the opening to the trap. Finally the trap was removed and the hood alone used in the later manholes, the hood being made of cast iron. Some basins have been constructed and have been in use for years without giving trouble, in which a regular "S" trap is placed just outside the basin, the inlet being protected with a cast iron hood.

Still another device used in Pawtucket was building the lower part of the basin of two concentric rings of brick, with a 2-inch space between them, and the inner ring built of soft, porous bricks. A pipe leading to the sewer was carried through the bottom of the outer ring, thus draining the space between the rings, and causing a partial drying of the dirt in the basin, the moisture from which passes through the inner ring of brick.

Concerning the top of the basin, Mr. Carpenter believed that great improvement has been made by substituting cast iron for the heavy stone tops used a few years ago. The heavy granite head was very expensive, and occupied a considerable space in the sidewalk, whereas, with the cast iron head now adopted in Providence and a number of the other cities, nothing but a light iron cover about two feet in diameter shows on the surface of the sidewalk. Another improvement is in the location of the basin. Instead of placing these at the intersection of the curb lines, the basin is located above the cross walk on one street, and an additional inlet or chute is located on the other street above the other cross walk and connected with the basin. Where corner basins already exist, the old entrance to the basin can be closed and two plain inlets be constructed, one on each street, connected to the old basin.

"When planning catch basin openings and connections, the speaker has often felt the lack of sufficient data relative to the approximate amount of storm water that will pass a given opening in the curb, and also the maximum quantity that will pass the form of trap and connection used. Inlets through the curb, of the form illustrated, generally measure about 4 inches by 24 inches, 4 inches by 30 inches, or 4 inches by 36 inches, as the location seems to demand. Eight-inch, 10-inch or 12 inch pipes are used for connections between the basin and the sewer, as the engineer's judgment dictates. The speaker raises the question, would it not be well to have more definite data than we at present possess respecting the relative capacity of various inlet open-

ings, traps and sewer connections? Investigations along this line might be made with profit."

Mr. Carpenter does not use or like the gutter inlet, but prefers the curb opening. He finds among other things that the gutter inlet is very apt to become clogged with leaves, stones and other matter from the streets. Most of the New England cities referred to in the discussion, however, seem to make more or less extensive use of the gutter inlet.

In Cambridge the "D" frame and grate are used, with the straight side of the "D" against the curb. The Cambridge frame and grate weigh about 65 pounds and cost about \$12.50 per set. They find that these are liable to clog in time of storm, for which reason a slot or throat is cut in the face of the curb, back of the grate.

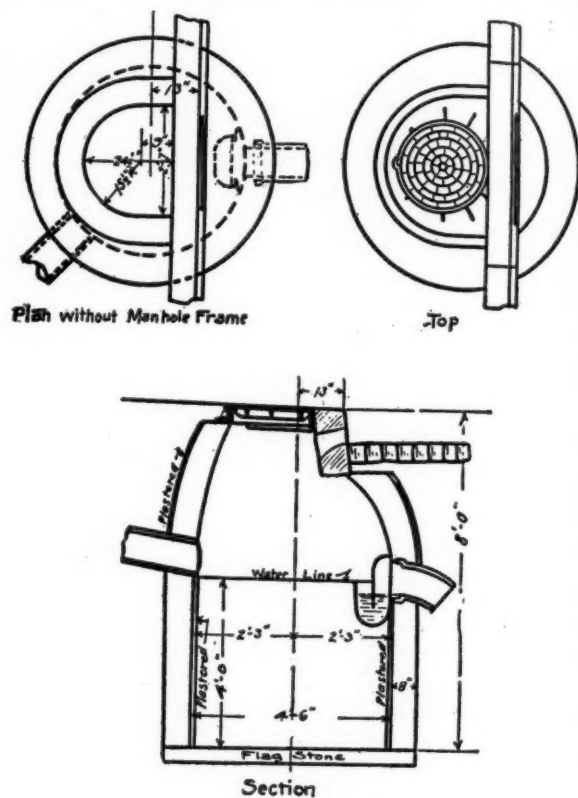


FIG. 3. PROVIDENCE, R. I.

The trap used is a cast iron hood which can be lifted up for cleaning out the pipe, the entire trap costing about \$5, and including a metal valve that opens outward toward the sewer to shut out sewer gas in case the water falls below the hood. One unusual feature of the Cambridge basin is the size of the outlet pipes, which were built some years ago of 10-inch pipe, then of 8-inch, and 6-inch pipe is now being used, and city engineer Hastings states that he has never heard of one of these being stopped up on account of its small size. As stated above, although there are 2,260 basins in the city, the number of cleanings last year was only 1,128, and these averaged 2.1 cubic yards per cleaning, which is about the capacity of the catch basin. The cost of cleaning was \$6.48 per basin, or \$3 per cubic yard. This cost has increased during the past ten years from \$2.58 per basin, or \$1.44 per cubic yard, while the number of cleanings has decreased from 2,340 to 1,128.

Boston, although claiming to have invented the "D" grate, has abandoned it for square grates, principally for the reason that they are much easier to pave against. Boston last year cleaned 9,907 basins, removing from each basin about 3¾ cubic yards. The cleaning is done by contract at cost of \$3.01 per basin. As the basins

are five feet in diameter and four feet six inches from the bottom to the level of the outlet, it is seen that in this case also the basin is in every case nearly full of dirt when it is cleaned. In fact, it is doubtful whether a basin of this size could be made to contain more than $3\frac{1}{2}$ cubic yards and still permit it to carry off any street water. Since $3\frac{1}{4}$ was the average contents of the basins cleaned, it would appear that all of them, before cleaning, had reached this condition of limit of capacity, and it would therefore seem quite probable that in the case of many of them, they had ceased altogether to serve as catch basins some time before being cleaned.

In the Boston parks it has been specified at times that the contractors may have the choice of using either brick or concrete in constructing basins, and they have usually chosen to use brick.

In Boston they had tried to find some form of mechanical cleaner, but had not discovered any which was practicable. There, and in Cambridge as well, they had tried a suction device known as the Otterson auto-educator. This device was described by Philip W. Taylor, who stated that it was an invention of George W. Otterson of Seattle, Wash., and consists of a centrifugal pump, sand educator, dump body and the necessary fittings, all mounted on a Kelly Springfield motor truck. The dump body is a steel box nine feet long, six feet wide and three deep, and is divided into two chambers, one holding water for liquefying the dirt in the catch basin; the other for receiving the dirt so removed. The latter chamber is divided by vertical steel baffle plates, one foot less in width than the wagon body and staggered so that the water pumped from the basin must flow around the baffles as it advances to the back of the machine, the chamber thus acting as a sedimentation tank. These baffles are hung on horizontal pipes at the top of the body and are free to swing so that when the load is being dumped the material may slide under them. Between this settling chamber and the water chamber is a steel plate screen through which the water passes.

The educator consists of an orifice and throat somewhat similar to a sand ejector. The tank having been filled with about 400 gallons of water, the truck is driven to a catch basin and the educator let down into the basin. The pump forces this water through hose to and through the educator. In passing through it sucks up the dirt from the basin, this dirt being made more or less liquid by discharging a part of the water through a pipe terminating in a nozzle which is operated to stir up and soften the material. The same water is used over and over again after depositing the dirt in the settling chamber. When the settling chamber is nearly full, the truck is driven to the dump and emptied. Mr. Taylor stated that the commissioner of public utilities of Portland, Ore., reported that in a test of $4\frac{1}{2}$ hours duration, 84 basins were cleaned, and that 137 basins were cleaned in an actual day's work of eight hours. The material removed from the 84 basins during the test totalled 13 cubic yards, or a little over 4 cubic feet per basin. In this connection it should be stated that "in the West the large curb openings are absent and all of the water passes through the grate openings, therefore the material is much easier to handle than in the East, where almost anything in size up to a football may be found." One criticism made by a city engineer of this and similar machines is that the entire working part of the machine is idle a large part of the day while going to and from the dump, and he suggested the advisability of having the pumping contrivance in a vehicle separated from the body or tank which re-

ceives the dirt, so that one excavating contrivance could be used with two or three dirt bodies.

In New Bedford, Mass., the type of basin which is being used at present is 6 feet inside diameter and 6 feet deep and is built up of concrete blocks 16 inches by 8 inches by 5 inches, which are manufactured by the city, the last three courses being built with specially bevelled blocks to reduce the size to 5 feet diameter. (See Fig. 1). The top is covered with a reinforced concrete slab 5 inches thick and 5 feet square, made of one part cement, one and one-half peastone and one and one-half sand, with the addition of about two quarts of hydrated lime to each bag of cement. In this city, the basins are cleaned on an average of twice a year, although some are cleaned more frequently than others. The cost of cleaning is about \$2.50 each.

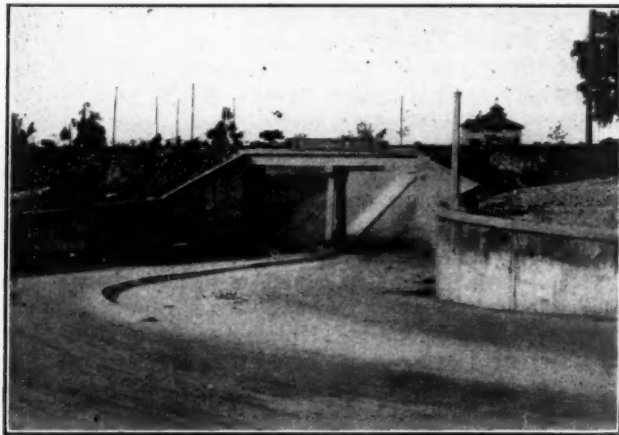
In Fitchburg, the basin outlet is usually 8-inch pipe placed 3 feet above the bottom, giving a storage capacity of about $2\frac{1}{4}$ cubic yards. Unless the basin discharges into a strictly storm sewer, a cast iron trap is used consisting of a flap valve to prevent odors coming from the sewer and a hood to prevent sticks or other obstructions from getting under the flap valve. On account of the many hills in that city, it is necessary to bank the grates or build a dam on the lower side in order to conduct the water into the basin. This was not considered an ideal way, and a ribbed surface grate was designed, having bars running diagonally across the gutter, the back edge of each bar being $\frac{1}{4}$ of an inch lower than the front edge of the grate. This makes a saw-tooth surface that slows down the velocity of the water and diverts it partially through the gully opening and partially down through the grate. This grate clogs with paper, leaves, sticks, etc., as do all other grates; but even though clogged, it still in most cases diverts the water toward the gully opening. Three complete rounds of the catch basins are made by the cleaning gang each year, but some basins do not need to be cleaned oftener than once in two years, while others require cleaning five to eight times a year. During 1915, 1,279 basins were cleaned, an average of $2\frac{1}{4}$ cubic yards being removed from each basin. As it was stated that the total capacity of each basin was $2\frac{1}{4}$ cubic yards, it would appear that no basin is cleaned until it is full and probably overflowing. An investigation of the operation of cleaning during May and June, 1915, showed that the teams spend 45 per cent. of the total time hauling the material. As the location of available dumps recedes from the center of the city as the latter builds up, the length of haul is increasing and this time will continue to increase unless some more rapid method of transportation is adopted.

Concerning gutter grates, W. L. Vennard, city engineer of Lynn, Mass., said: "Basins as sometimes built without throats, do not take the water efficiently. The grate, at the beginning of a rainstorm, becomes covered with leaves and paper or other debris and the water passes over, while those that have the throat permit the water to enter through it and the swirl of water entering generally tends to keep the grate clearer from debris than when there is no throat." In Lynn the D grates are supplemented by a throat cut in the curbstone. The basins are cleaned through the D grate in the gutter, there being no opening in the sidewalk.

SAFETY CURB AT BAD TURN.

The principal boulevard entering Huntington Beach, Cal., passes under a railroad, with a bad turn at one end of the underpass. To prevent collisions between vehicles at this point by keeping them on the right side of the road, a double-faced curb has been constructed,

6 inches wide on top and 12 inches high in the center of the roadway and extending for about 150 feet each side of the subway or underpass. At each end of this curb is a large electric sign warning to "Keep to the Right."



SAFETY CURB AT BAD TURN.

In beautifying the roadway, the street department has placed at each end of this curb large parking plots, ornamented with shubbery and flowers, about 30 feet long and 14 feet wide, which also serve to gradually narrow down the boulevard from its width of 75 feet to the 50-foot width of the subway.

RUSTING OF SERVICE PIPES

Theory for Difference in Rust Resistance of Cast Iron and Steel Based Upon Difference in Structure and Manufacturing Temperature.

At the meeting of the New York Section of the American Waterworks Association in February, a paper was read by Harry Y. Carson, of the Central Foundry Company, entitled "The Rusting of Pipes in Service," in which he compared the structures of cast iron and wrought iron and advanced a theory, based upon the difference in structure of the two, to explain why the latter rusted much more rapidly than the former.

He first called attention to the fact that iron containing more than 2 per cent of carbon can not be rolled, but must be cast into shape. Also that gray cast iron solidifies at a lower temperature than either steel or pig iron. On the other hand, steel and wrought iron pipes are made at temperatures below 1,500° F., or more than 1,000° below the solidifying temperature of the metal. This latter temperature being so much below the crystallizing temperature, there results a flaking off or exfoliation of its particles under the corrosive influence of ordinary service conditions; as an analogy to which he suggested the difference between granite and sandstone. In the case of wrought iron made by the puddling process, the effect of rolling and rerolling is even more noticeable than in the case of steel, but wrought iron pipe is given a final heat treatment of about 1,200° F., which gives a fair degree of fusion to the gross slag particles distributed through the skelp from which the pipe is made. "The inhibiting properties of this slag when carefully distributed through the wall section of the pipe compensate for the low temperature at which wrought iron pipe is rolled. Nevertheless, both wrought iron and steel pipe last approximately the same under like conditions of service." This difference in heat treatment Mr. Carson believes to be the explanation of the difference in corrodible properties of steel and cast iron.

Whichever of the several theories of corrosion be considered, one point is found in all—that the iron particles must be in direct contact with oxygen and moisture before rusting can take place, and the prevention of rusting of any iron pipe seems to be summed up in the one solution of keeping moisture and oxygen from reaching the iron itself.

When cast iron rusts, there forms on the surface a reddish brown iron oxide, which is very hard, and which so tenaciously covers the surface of the pipe that it



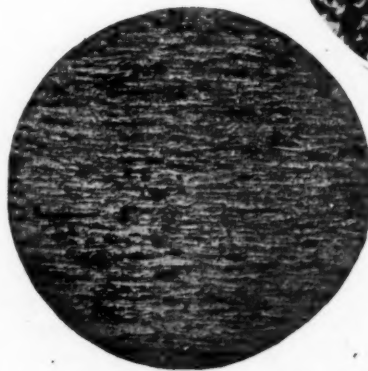
RUST HOLE IN 1 1/4 INCH PIPE IN NEW YORK MUNICIPAL BATH AFTER 4 TO 6 YEARS' SERVICE.

penetrates down in between the surface crystals, and forms a perfectly impervious coating which is not penetrated by moisture and oxygen. Hence galvanic action or other cause of rust stops on such a surface, and the life of the pipe is insured by this oxide. On the other hand, on wrought iron or steel pipe, the rust forms in a loose scale which is soft and pervious to moisture and oxygen, and which can readily be removed with a penknife or the thumb nail from the surface of the pipe. When such a rust scale drops away or is removed, fresh, bright particles of iron are exposed to oxygen and moisture so that further rust takes place, further scales are formed and removed, and so the process continues indefinitely.

Mr. Carson quotes a report before the New England Waterworks Association as giving the following comparative data of materials used for house connections:

	Years before trouble begins.	Life of pipe in years.
Plain iron or steel pipe.....	12	16
Galvanized pipe	15	20
Lead pipe.....	10	35
Lead lined pipe.....	10	23
Cement lined pipe.....	14	28

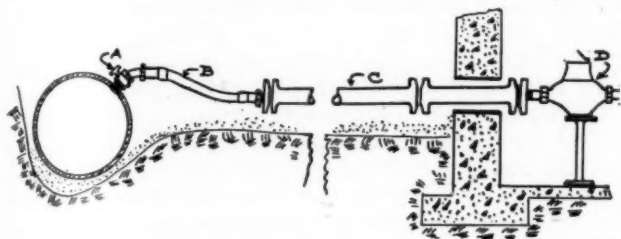
PHOTOMICROGRAPH OF CAST IRON.



PHOTOMICROGRAPH OF STEEL (0.08 CARBON) GIVEN SEVERAL DRAUGHTS AND FINISHED AT LOW TEMPERATURE. STRUCTURE OF SUCH MATERIAL IS PARTIALLY RESTORED BY ANNEALING OR HEATING AT VERY HIGH TEMPERATURE.

In many and perhaps the majority of cases leakage continues undiscovered during the many years represented by the time between the figures in these two columns. This table shows that galvanized pipe is little

better than black pipe. "Cast iron pipe for service lines as well as for mains has been installed at low cost, and the most perfect results can be obtained provided satisfactory joints are used. The minimum size should be 2 inches internal diameter, and this can be laid at approximately the same cost per foot as 1-inch lead service pipes. For pipes less than 2 inches internal diameter, the material should consist of brass or copper." It is not necessary to provide more than a $\frac{3}{4}$ -inch or 1-inch



METHOD OF INSTALLING CAST IRON SERVICE PIPES. Brass (A and D), lead (B) and cast iron (C) the only materials used.

tap on the main. The construction for such a connection is shown by one of the illustrations. In connecting the service pipe to the street main the present practice of using a lead gooseneck is recommended to provide for settlement and expansion. A flanged bushing can be used for connecting the 2-inch pipe to a $\frac{3}{4}$ -inch meter.

WOOD MEDIUM FOR SPRINKLING FILTERS

Test in Toronto of Use of Laths and Brush Instead of Stone as a Filter Medium for Sprinkling Filters.

Experiments have been under way in Toronto, Ontario, for more than three years past with the use of wood in various forms as the filtering medium for sprinkling or trickling filters. In a paper in the Journal of the Royal Sanitary Institute, Lieut.-Col. G. G. Nasmith, director of laboratories of the Department of Public Health of Toronto, describes these experiments, which were conducted under his supervision. In 1912 he began experiments with the purpose in mind of reducing the cost of the filters if possible. He believed that, if the amount of surface or bacterial slime could be increased within a given volume, then a greater quantity of sewage could be oxidized in such volume in a given time. Experiments were designed with a view to increasing the surface of the medium per cubic yard and of allowing freer circulation of air than the ordinary types

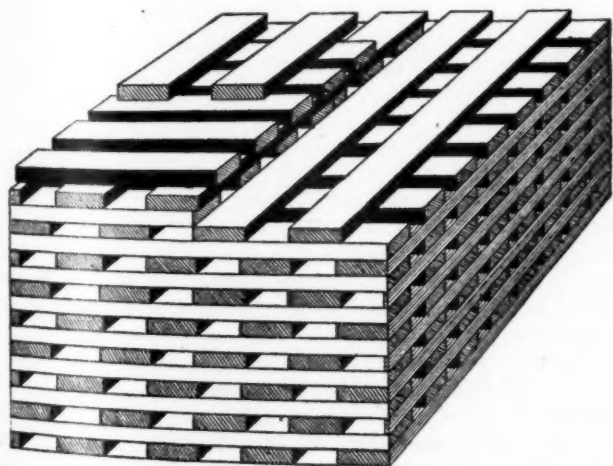


DIAGRAM SHOWING CONSTRUCTION OF LATH FILTER.

of filter beds. The first filter prepared for experimental purposes was 6 feet square and made of laths. The laths of the lowest layer were laid parallel to one another, the spaces between the laths being a little less than the width of the laths themselves. On this was laid a second layer, the laths at right angles to the first and with the same spacing. Additional layers were added, the laths in successive layers at right angles to each other, until a depth of 4 feet was reached. In passing through this filter the sewage had to flow over a very large surface, and air could enter freely from all sides and the top.

The sewage treated was first passed through a sedimentation tank and then allowed to trickle through the lath filter. The filter matured in less than a month and was shortly yielding a non-putrescible effluent at the rate of 6,000,000 gallons per acre per day, where the standard type of stone filter, operated, as a control, alongside the lath filter treated only 2,000,000 gallons. The lath filter has been in continuous use for nearly four years and has never failed to give satisfactory results.

After operating the lath filter, it was argued that poles would give greater surface because they would come into contact only along very narrow surfaces when piled up like the laths. Two filters were built of poles, each filter 6 feet square and 6 feet deep; and after maturing they yielded practically the same results as the lath filter. They were more difficult to construct, however, and the distribution of the sewage was not uniform and short-circuiting was liable to occur. Finally, brushwood pressed into bundles was adopted, as it seemed to provide the combination of a very large surface area and the presence of air.

When the town of North Toronto was annexed to the city of Toronto, a few years ago, it was operating three sprinkling filters with stone medium, each 30 feet in diameter. In the spring of 1914 the stone was removed from one of these filters and bundles of brushwood, wired together, were placed in the filter to a depth of $4\frac{1}{2}$ feet. A space of 1 foot was left between the brush and the wall, and a small space in the center, so as to admit air freely. The old revolving distributing sprinkler was used for applying the sewage and in two months the brushwood filter was treating 6,000,000 gallons per acre per day. A high degree of nitrification has been obtained, the effluent has been uniformly stable and the installation is considered by Lieut. Nasmith to be a decided success. The filter has been in continuous operation for two years. Like all filters in Canada, it is covered to prevent freezing in winter. Both the lath filter and the brush filter are continuously covered with slime and thus are kept constantly wet and no signs of incipient decay have appeared in either.

The advantages claimed are that brush is cheap and may be obtained almost anywhere; that skilled labor is not required in the construction; that it does not sludge; that it is durable; that the distribution of sewage over the surface of the filter does not need to be very uniform, the general tendency being to redistribute itself in the filter meshwork; it gives a maximum amount of surface with a freer circulation of air in a unit volume of space; and it has proved to be a success when treating sedimented sewage on a large scale at a rate three times as high as standard stone filters will treat.

Patents for the system were applied for in the year 1914 in order to protect the city of Toronto, but no rights or royalties are claimed; in fact, it is hoped that the system may be used by communities where the high cost of the accepted types of installation have prohibited their use.

The following further information has been given by

George Phelps, engineer-in-charge of the North Toronto disposal works. The floor of the filter in which the brushwood was used slopes each way to under drains. The brushwood was formed into bundles or mattresses of two cubic yards each, which were made by placing the brush as cut into a wood box of the required shape and pressing it down by means of a cover or follower and a long wooden lever. While pressed, the mattresses were wired and in this condition were easily handled. Witch hazel was found to be the best material for making up, but almost any kind of brush is suitable, provided no dead wood is used. It must be cut in the fall or early spring, when there are no leaves on it. The cost of cutting, bundling and hauling about one-half mile and placing in the filter was \$1.20 per cubic yard. Although the brush was placed in the filter to a depth of 5 feet 6 inches, in a few months it had settled down about 12 inches, since which no further settlement has occurred. Mr. Phelps recommends that filters be made at least 7 feet deep, and after the bed has been working for 12 or 18 months, that sufficient new brush be added to restore it to this depth. The deeper filter would give the sewage a longer time in contact with the medium and should give better nitrification. He thinks that a 7-foot filter could probably be worked efficiently up to 8,000,000 or 9,000,000 gallons per acre per day.

The brushwood filter started in at a rate of 2,000,000 gallons per acre per day, which was increased gradually to 6,000,000 gallons a year later, and then to 7,500,000 gallons, at which rate it has been operating since December, 1916. Samples of sewage and effluents from both the brush filter and a slag filter operated with the same sewage, have been taken regularly five days a week until about four months ago, since when samples have been taken only two days a week. The average of samples taken from May to November, 1916, of tank effluent, brush filter effluent and slag filter effluent, give the free ammonia as 22.3, 16.9 and 11.4 parts per million, respectively; albuminoid ammonia as 3.94, 2.41 and 2.20, respectively; and the putrescibility as 35, 99.7 and 100, respectively. This gives a reduction in free ammonia in the brushwood filter effluent of 24.2 per cent and in the slag filter effluent of 44.4 per cent. The reduction of albuminoid ammonia was 39.1 per cent in the brush filter effluent and 44.2 per cent in the slag filter effluent. The putrescibility of the two effluents differed very little. Between December and May, 1916, analyses were made to determine the nitrates, and these were found to be increased from 2.50 in the tank effluent to 2.55 in the brush filter effluent (an almost negligible increase); but to 6.00 in the slag filter effluent, an increase of 140 per cent. Mr. Phelps believes that the failure of the brush filter to form nitrates in any amount is due to the rapidity with which the sewage passes through the filter. Possibly with a depth 50 per cent greater, as he advised, the amount of nitrification may be considerably increased.

ROAD BUILDING IN ALASKA.

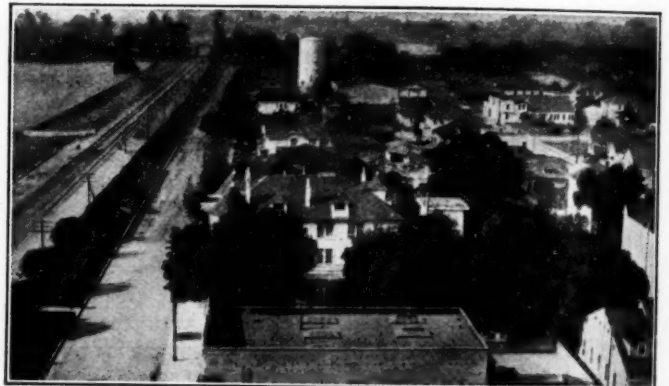
Different sections of the country have their own difficulties to overcome in the location and construction of roads, but one was encountered in Alaska, near Nome, which is probably peculiar to that section of the country. Last summer it became necessary to build a road five miles long along a hillside where investigation showed that bedrock was covered with six feet of gravel, and this in turn with forty feet of clear ice, on top of which rested two feet of moss and tundra. In this case the only practicable construction appeared to be to cover the roadbed with willow corduroy, and this in turn with gravel.

PALO ALTO'S PUBLIC SERVICE PLANTS

Current for Municipal Lighting and Water Works Furnished by Municipal Power Plant—Finances and Economies.

Palo Alto, California, a city of about 6,000 population operates an electric power plant which furnishes current for electric lighting and also for the pumping plant of the municipal waterworks. Gas is furnished by the Palo Alto Gas Company, which pays 2 per cent of its gross earnings to the city in return for the franchise. The following information concerning these enterprises is taken from the 1916 annual report.

The power plant received during the year \$44,893 for commercial power furnished, furnished \$4,078 worth of current to the waterworks pumping plant, and \$3,174 worth for street lighting. In addition, small amounts of current were furnished to the destructor plant and for charging the fire alarm batteries. The total credits amounted to \$54,561. The cost of manufacture included \$12,103 for operating and \$1,632 for maintenance of the power plant. Distribution cost \$6,906, including both operation and maintenance; and general expenses, in-



PALO ALTO, LOOKING TOWARD WATER TOWER.

cluding taxes and rent, totalled \$5,370. Bond interest and depreciation amounted to \$11,917, giving a total debit account of \$39,749, and leaving a net profit of \$14,812, which was carried to general revenue and expenditure account.

The rates charged are 7½c. to 4c. per kw. h. for lighting; 3c. to 2c. for power; and 2c. for heating and cooking; a minimum bill of \$1.00 per month being charged. The city expected to lower the lighting rate to 4½c. per kw. h., plus a service charge of 50 c. a month. The costs per kw. h. for the year for the 1,347,165 kw. h. output were as follows: Fuel, 0.41c.; total operation (fuel, wages, plant supplies, etc.). 1.02c.; total plant cost (including interest and depreciation), 1.53c.; line maintenance, 0.51c.; total distribution, (including interest and depreciation on lines and services), 0.88c. Total cost, including taxes, office expenses, etc., 2.81c. per kw. h.

Of the total output, 783,534 kw. h. was metered in commercial services; 203,884 was used at the pumping plant; 78,741 for street lighting, 15,657 at the power plant, 2,875 at the incinerator and 10,585 for the Diesel engine cooling. This leaves 251,890, or 18.7 per cent of the total output, as lost in the lines and unaccounted for.

The net earnings during the past three years have been \$6,973, \$11,519, and \$14,812, respectively. "Special attention is called to the increase in net earnings for the last two years over former records. This has been due almost entirely to the Diesel engine, because of its remarkable fuel economy. The Diesel engine was installed

in the fall of 1914 and only operated about one-half of the year 1914-1915; therefore the net earnings for that year are not as great as during the year 1915-1916. The installation of this engine has been very satisfactory, as it not only adds materially to the capacity of the station, but has created such an increase in the economical operation of the plant as to pay for its first cost within a period of three years.

"Attention is also called to the output of the station, which has increased 18.4 per cent over the previous year. This gain in output is largely due to the popular demand for electricity for cooking, heating and power purposes."

The waterworks' gross earnings during the year were \$30,320, which is 9.8 per cent greater than those of the previous year. The net earnings, \$7,752, were 84 per cent greater. "The great gain in net revenue is due largely to the more economical operation of the water pumping station and through a lessening of trouble in the pipes of the distribution system. We also record increased accuracy in water meters, due largely to the making of certain replacements each year, which has improved the accuracy of water measurement and thus added to the revenue. The new pump at the water tower has been notably useful in reducing pumping expense. It delivers 1,460 gallons of water per kw. h. into the distributing system, while the pumps at the waterworks only deliver 750 gallons for the same amount of energy."

Of the \$30,320 credited to the plant, \$23,951 was from commercial sales, \$1,038 for street sprinkling, \$2,721 hydrant rental and the remainder from smaller amounts used in sewer flushing, park watering, etc.: The amount of water used was divided as follows: Commercial services, (metered), 132,885,900 gallons; street sprinkling, 8,647,005; street work, 113,500; fires, 165,000; sewer flushing, 1,005,000; settling ditches, 465,000; power and water plants, 10,385,218; parks 1,300,000; county, (for sprinkling), 1,193,600; broken mains and miscellaneous, 315,150. This leaves unaccounted for 33,009,094 gallons or 17.3 per cent of the total amount pumped. Of the total accounted for of 157,482,146, 11,695,500, or about 7½ per cent was used for street and other public purposes. The average gallons used per capita per day for domestic

STREET PAVEMENTS [IN LOWELL

The Kinds in Use and Essentials of Construction—
Modern Granite Block for Main Highways—
Bituminous Top on Old Macadam.

By H. R. SPRAGUE.*

For the past ten years Lowell, Mass., in keeping with other progressive American cities, has followed an established and comprehensive program of street construction. This work, for the main part, has been a sort of evolution of pavements, a reconstruction of our streets; changing from the old, uneven, unsanitary, costly-to-maintain, vehicle and automobile destructive, nerve racking pavements of granite block with sand filler, to the modern, smooth, clean, cheap-to-maintain, easy of traction, non-slipping permanent pavement of grouted granite blocks on a concrete foundation.

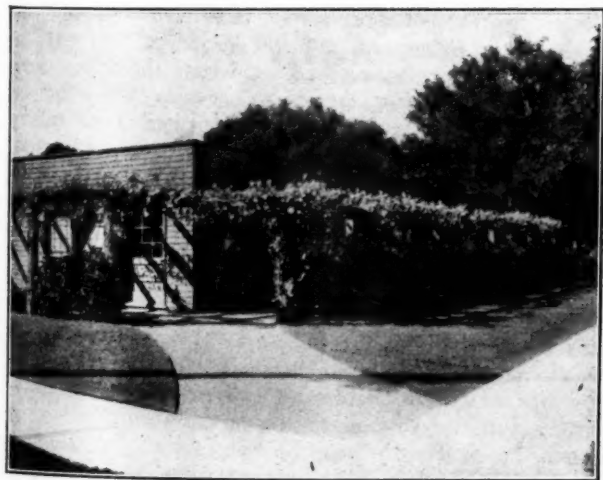
The grouted granite block pavement described is our choice for streets of first importance, that is, main arteries of travel, business streets, down town streets, streets with a double electric car track line, and, especially, those streets which have a large amount of traffic. Selecting a proper pavement for any city or town is a very perplexing problem, as is well understood by every highway engineer and municipal authority. Especially is it a hard problem for those city and town officials who are hampered by a lack of available money for both road construction and street maintenance.

In the selection of a permanent pavement, that is, either brick, wood, granite, concrete, asphalt, or other equally as good pavements in standard practice, the availability of the surface material, which greatly reduces the cost of the completed work, is of prime importance. I refer to the surface metal only, and not to the foundation. It is well understood that a cement concrete foundation, of necessary thickness determined by the engineer to withstand the traffic to which the road is to be subjected, is required in the use of any so called heavy-class permanent surfacing. Local materials which are available are to be selected, and any city or town that chooses from the above list of pavements, and then uses that material judiciously, in accordance with the best practice and under the latest specifications, will not go far astray, and the authorities who are held responsible for road and street construction need not fear criticism for their action.

Our paving stone is bought in either Massachusetts or New Hampshire within a radius of from five to twenty-five miles. Such close proximity to the quarries makes for a low price for paving blocks, besides giving us excellent deliveries at Lowell. We have used both the 6-inch and 4-inch depth block. The smaller block predominates, and is generally accepted as of sufficient depth for most of our paving work.

In connection with using new granite blocks from the quarries, Lowell is also extensively using old granite blocks removed from the streets under reconstruction. These blocks, which measure 9 to 12 inches long, 6 to 8 inches deep and 3 to 5 inches wide, are split open and very slightly redressed, so as to present a new surface for wear. They cost about one and one-half cents each to turn out, and as we get about two blocks for one old one, thus doubling the surface area, it is safe to say that a direct saving of from seventy-five cents to one dollar per square yard is easily made. In the final analysis, the finished pavement, using old, redressed blocks, is equally as good as the pavement containing all new granite blocks. By this method we are able to use

*Assistant engineer on streets.



ROSE-BOWERED BUILDING IN CORPORATION YARD,
PALO ALTO.

uses was 65.5 and the average per capita for all purposes was 94. The maximum consumption for all purposes was during July, reaching 137 gallons; while the minimum consumption for all purposes occurred in December, and was 47 gallons. The total cost for power, operation, interest and depreciation, office expenses, taxes, etc., averaged 11.8 cents per million gallons during the year.

our old paving blocks to better advantage and more economically than by employing them for other purposes.

The following are necessary for the proper construction of grouted granite block pavement:

1. Have sub-grade well rolled and all soft places eliminated. Six inches of crushed stone spread over the sub-grade and rolled to a true crown. Mixture for foundation, 4 sand to 1 cement.
2. Sand to a uniform thickness of two inches should be spread over the foundation, or a 1-3 mortar mixture laid one inch thick.
3. The blocks, after careful culling, should be well rammed and at the same time pea stone should be broomed into the joints.
4. For the grouting, be sure the cement is good and the sand clean and sharp. A small percentage of clay is good to use as a binder.
5. Be careful to use the correct proportions of sand and cement. Use one part cement and one part sand for mixture.
6. If a mixing machine is not used, keep the mixture constantly agitated in the box. Remove the grout from the box with scoop shovels. Never dump the contents of the box upon the street. Wherever this is done there will be a bare spot in the grouting.
7. Wet blocks thoroughly before applying grout.
8. As the grout is poured upon the blocks, throw in pea stone and broom it into the grout, bringing the whole to an even, smooth surface.
9. Never do any grouting during cold or frosty weather. Good results can seldom be obtained after November 15th in New England.
10. If grouting is done during very hot weather, precautions should be taken to keep grout moist. This can be done if the weather is extremely hot by covering it immediately with a half inch of sand and frequently sprinkling with water.
11. Do not allow any traffic upon pavement for at least seven days after grouting.
12. For best results use a medium soft granite, similar to New Hampshire granite.

Since 1907, we have been laying a certain amount of this pavement annually, until today Lowell has 7.1 linear miles, or 158,200 square yards. On account of its reasonable cost, minimum expense of maintenance, and apparently long life, this pavement appeals to the taxpayers and general public in such a way that there can be no mistake as to its popularity.

Considering the geographical location of our city, the traffic and uses of its main streets, I think granite block is, far and away, the best and most economical pavement Lowell could use in the construction of this class of streets. I say this without intending to injure by reflection, in any way, any other accepted pavement. They all have their merits, and when used under the right conditions and in proper localities will afford equally as satisfactory road surfaces.

In the second class of streets—those which do not have so much traffic as streets of heavier construction, the less important arteries of travel, and, particularly, streets located in the residential sections, where lighter metalling is sufficient and consequent quiet is desired, we are using the old waterbound and bituminous macadam.

The per cent of waterbound macadam is small, this type being used almost wholly on streets near our local ledge crushing plant, where we are able to use up the tailings to good advantage, with a resulting low priced macadam. Waterbound macadam is still used on streets of high grades where a smoother surface would not be practical. With these exceptions, macadam that has been

laid since 1910 has been for the most part bituminous, with either asphalt or tar binder.

Local stone and trap rock have both been used. Local stone is soft and very low in abrasive quality; consequently, this stone makes an inferior surfacing material, but it has been used successfully in the foundation course.

On new construction of bituminous macadam, 2½ inch size of local or trap rock is spread upon a well drained, compacted sub-grade. This course is four inches thick after being rolled with a steam roller weighing ten or fifteen tons. Upon this course, bitumen, to an amount of one and one-half to two gallons per square yard, is spread or sprayed into the stone voids. A good penetration should yield a depth of at least two inches. This application is then covered with pea stone or screenings, or gravel about three-eighths of an inch diameter, in order to take up any excess of bitumen. The stone is then rolled lightly to shape the surface and bind the materials, and, at this time or later, a sealing coat of bitumen, from one-half to three-fourths of a gallon per square yard, is sprayed upon the surface and immediately covered with plenty of screenings, rolled well and thoroughly; after which the street can be opened to travel.

Old macadam streets have been reconstructed with a bituminous top as follows:

The old surface is broken up and scarified. Steel harrows, with both straight and curved teeth, are drawn through the loosened crust, bringing all good stone to the top and allowing dust and dirt to drop to the bottom. After a thorough harrowing until the stone is clean and all foreign matter removed, the street is then shaped up and, if needed, new stone of 2½ inch size is spread into the old stone. The process from this stage on is the same as for the new bituminous macadam construction previously described. This method of reclaiming old macadam streets has proven to be both effective and economical.

The last type of road surfacing used in Lowell is gravel. This material is spread upon unimportant side streets in the outlying sections. It is the cheapest road metal procurable, not costing more than thirty cents per square yard, and proves very satisfactory as a surfacing for streets of light traffic, provided it is used with knowledge and proper attention given to drainage and subgrade in the beginning. Later, during the maintenance period, the following work is necessary: Filling depressions and ruts, reshaping and dragging or rolling, removing all vegetable growth from the surface, clearing the gutters, and occasionally resurfacing with a light coat of material.

Since 1914 Lowell has been using an asphalt road oil upon its macadam and gravelled streets. The purpose of this has been, primarily, for the suppression of the dust nuisance, superceding the use of water. However, it has served another purpose as well, that of a preservative. This spreading of oil upon the old, dry road surfaces has restored them and increased the length of their usefulness, thus assisting greatly in their maintenance, besides adding to the comfort of the public.

In conclusion, I would say that these are the experiences of Lowell in the selection of proper road materials for street pavements. The pavements mentioned are not the only ones in use. Asphalt, asphaltina, wood block, concrete, brick and bitulithic pavements of more or less area have been laid. After trying all these, Lowell has accepted granite as the best pavement, as it fulfils all the requirements that a first class pavement should possess, besides being economical. The use of macadam and gravel has its best argument in low cost and comparatively light upkeep, considering the initial expense.

Municipal Journal

Published Weekly at
50 Union Square (Fourth Ave. and 17th St.), New York
by
Municipal Journal and Engineer, Inc.

S. W. HUME, President
J. T. MORRIS, Treas. and Mgr. A. PRESCOTT FOLWELL, Sec'y

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Telephone, 2805 Stuyvesant, New York
Western Office, 1631 Monadnock Block, Chicago

Subscription Rates.

United States and possessions, Mexico and Cuba.....\$3.00 per year
All other countries 4.00 per year
Entered as second-class matter, January 3, 1906, at the Post Office at
New York, N. Y., under the Act of Congress of March 3, 1879.

Change of Address.

Subscribers are requested to notify us of changes of address, giving
both old and new addresses.

Contributed Articles and Reports.

Contributions suitable for this paper, either in the form of special
articles or as letters discussing municipal matters, are invited and
paid for.

City officials and civic organizations are particularly requested to send
Municipal Journal regularly their annual and special reports.

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years' research and practical experience in its special field, is at the
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SPRINKLING FILTER MATERIAL

One of the objections to the use of sprinkling or of contact filters in many localities is the great expense of the stone required. For a filter six feet deep an acre requires nearly ten thousand cubic yards of stone, which must be of a kind that does not disintegrate readily under water, and be broken and screened to a uniform size. Stone considered suitable costs as much as \$2 a cubic yard in some localities, or \$20,000 per acre delivered. Other substances such as broken glass, coke, broken pieces of hard-baked pottery, etc., have been tried with more or less success. The use of wood seems to be a novelty, in that it is of vegetable origin rather than of mineral, and is a substance subject to comparatively rapid decay. But experiments in Toronto seem to indicate that it can be used as a filtering medium with considerable success, and does not decay during several years of such use.

The use of brushwood for this purpose apparently is not so cheap, however, as might be imagined, costing \$1.20 per cubic yard, and afterward compacting so as to make the cost about \$1.50, which is little if any less than the cost of suitable stone in some localities. Moreover, it apparently is not practicable to clean the wood if it becomes coated too thickly, but an entirely new supply must be obtained; while broken stone can be washed clean and replaced. As to effectiveness, it is claimed that it gave a non-putrescible effluent at the rate of seven and a half million gallons per acre, which is three or four times the rate considered practicable with a broken stone filter. But on the other hand, practically no nitrification of the sewage took place, according to the tests; and this matter of degree of purification effected apparently needs more investigation before this construction is adopted as satisfactory for general use.

SUPERVISION OF MUNICIPAL PLANTS.

Those who are interested in sewage purification were undoubtedly disappointed that no definite facts or figures were given in the article last week describing the San Marcos activated sludge plant to show what results were secured. The author stated that no regular tests have been made at the plant, apparently the only tests being a few stability tests of the effluent. It is unfortunate that this plant, which claims the honor of being the first of the kind to operate in regular service treating all the sewage of a community, should not make any effort to determine whether or not it is a success; or if so, to what the success should be attributed. It may be that the activated sludge part of the plant performs almost no useful service; for much of the suspended matter is removed from the sewage in the sedimentation tank, and the surplus activated sludge is pumped into this tank and mixed with the plain sedimentation sludge; so that really it would seem to be doubtful, in the absence of chemical, physical, and bacterial analyses, whether the cost of the activated sludge part of the plant was not wasted money. We do not claim that it was, but merely that there are no conclusive facts to prove the contrary.

Another illustration of the same idea is found in the use of chlorine in water purification plants, a mass of information concerning which we expect to publish next week. In many small cities chlorine is added in quantities which may or may not be adapted to the needs of the case—there is no one connected with the plant who has any chemical knowledge; and of the results obtained (unless one of these is objectionable taste) both officials and consumers are ignorant. Several superintendents report that in their case the water is rendered absolutely sterile at all times, without having any figures to offer in support of the statement.

This neglect to know definitely what municipal plants are doing is in most cases due to failure to realize the importance of such knowledge. In most states the state board of health will analyze samples of water sent to it, and will instruct the plant officials in the taking of samples and in the proper operation of the plant. But if aid is not obtainable from this source, an expert in plant operation should be employed to spend a week or two at the plant to study it and then to act as consultant in its future operation.

The people's lives, health and property are too valuable to be imperiled by ignorance or indifference in those who have plants of this kind in charge, or by their own parsimony in failing to employ competent supervisors.

ROAD BUILDING AND THE LABOR SITUATION.

The American Highway Association reports that during 1916 the cost of building some classes of roads was very high in many parts of the country and there are evidences that this condition will continue through at least the first half of 1917. This was foreseen by many experienced contractors, whose bids were so high that in some states, such as New York, it was not unusual for every bid received on state road work to exceed the engineer's estimates. Contractors have not attempted to conceal the fact that on some work their books show a loss, occasionally quite heavy, which was due as a rule to the unprecedented scarcity and high price of labor. Inasmuch as many highway commissions will shortly undertake work, it will be well for them to remember in preparing their plans that the old basis on which costs were estimated is no longer applicable in many sections of the country; old estimates of roadbuilding should be revised and new estimates should be based on the condition of the labor market as it is today.

The WEEK'S NEWS

State Highway Legislation in Illinois, Missouri, Idaho, Colorado, New Jersey and Utah—Lowell's Water Works Investigated—Municipal Lighting Planned for Portland, Ore.—Natural Gas in Kansas—Fires in Detroit and New York—Commission Victories and Defeats—County Manager Plan Defeated—Street Cleaning in Erie and Oshkosh—Traffic Problems in New York Increase.

ROADS AND PAVEMENTS

Reorganizing Illinois Highway Department.

Springfield, Ill.—A number of county engineers were recently called here to confer regarding the \$60,000,000 bond issue for highways and the reorganization of the engineering department of the state. The bond issue will give the department of highways \$60,000,000 at once. The bonds will cover a period of 20 years. State and county aid will give Illinois \$10,000,000 each five years, and there will also be the federal aid. The aggregate will enable the state to construct over 5,000 miles of roads. These highways are to cost not less than \$10,000 a mile. Under the reorganization of the engineering department, there will be bridge, road, drainage, maintenance, civil, railroad and mine engineers. The state will be divided into engineering districts so that each section will have at its disposal competent engineers.

State Highway Department for Missouri.

Jefferson City, Mo.—The two houses of the legislature approved the report of the conference committee which agreed on amendments to the good roads bill and the bill was sent to the governor. By the bill the state complies with the federal regulation for participation in the federal road funds. A state highway board is created to have supervision of the construction of state roads. The state will pay half the cost of the road construction under the joint federal and state fund arrangement, the remainder to be paid by the counties in which roads are built. It is proposed to build 3,500 miles of road within four years.

Replacing Old Brick Sidewalks.

New Haven, Conn.—From the annual report of James A. Howarth, director of public works, which has been filed at the mayor's office, a vigorous prosecution of the attempt of the present administration to replace brick sidewalks with cement is evident. During the past year a total of 2,256 defective sidewalks have been reported, and 1,099 have been re-laid or repaired. The replacing of brick with cement walks has been continued so effectively that at the present time only 595 brick walks remain in the city. Of these, 156 are in the second, and 119 in the third ward, while the others are scattered. In these two wards the campaign will be continued for up-to-date cement walks during the present year.

\$1,000,000 for Idaho Good Roads.

Boise, Ida.—The legislature has provided for \$1,000,000 good road bonds, the senate having passed the house bill creating the issue. It was amended so that the bonds may be sold during the present session of the legislature by the state treasurer, the legislature ratifying such a contract, if it is made. This bill not only makes available for the use of the state highway commission \$1,000,000 state funds with which to build good roads, but a large amount of county funds together with federal post road and forest road funds, bringing the grand total up to over \$2,500,000. The \$1,000,000 is apportioned to the main highway arteries, as designated by the state highway commission. By amending the measure so that the bond issue may be disposed of in its entirety by the state treasurer during the time remaining when the legislature is in session without advertising their sale, it was pointed out by Senator Rockwell, the state would save close to \$40,000 by avoiding the payment of various commissions usually incident to

advertising methods. He recited that this had been done before on bond issues with a saving to the state and argued that the sale brought about while the legislature is in session if made known would bring bond buyers here for immediate action.

Geological Survey of Road Materials.

Denver, Colo.—The rocks of Colorado are to be used for road material, each applied with regard to its especial fitness, according to the plan of the state geologist and head of the department at the University of Colorado. The elaborate plan of the state highway commission which provides for extensive improvements of roads, will be of no avail if attention is not paid to the adaptability of the material used, Professor George declares. A bill introduced in the legislature increasing the appropriation for geological survey work from \$15,000 to \$30,000 will make it possible to carry out the plan, it is said. Survey parties will be sent out to examine the rocks along the state highways, and each specimen will be reported for its durability under traffic of steel and rubber tires. The northwestern part of the state has much bituminous material, some of which appears to be suitable for surfacing purposes, Professor George stated.

Road Legislation in New Jersey.

Trenton, N. J.—With only one negative vote, the Senate has passed the direct state road tax which went through the Assembly in a storm of protest. The tax is on real and personal property and the money will be used for road construction. In effect, it is stated, \$8,000,000 would thus be added for this purpose to the \$7,000,000 voted by the people last fall under the Egan act. The direct tax was attacked because railroad property and bank stocks are exempted from the levy and because an undue burden would be put on the more populous counties who would receive no road benefits. The Senate has passed two important road bills. The McCran bill establishes the routes for the highway system and gives the provisions for the construction of the roads. It provides fifteen trunk routes of highways reaching all the important parts of the state. Senator Osborne, of Essex, offered an amendment designed to provide absolute open bidding on road contracts, he claiming there should be no monopolies on patented pavements. The amendment was defeated. The companion bill reorganizes the State Road Department. It provides for a non-salaried State Highway Commission of eight members to be appointed by the governor, the governor to be ex-officio and have the deciding vote if necessary. This commission will select the state highway engineer, who may be from outside the state if necessary, and all the other officials not protected by civil service, and will have full control of the department.

Road Legislation in Utah.

Salt Lake City, Utah.—The house, after exciting debate, indorsed the senate's action on the proposed \$2,000,000 bond issue for good roads. The bill met with several formidable proposed amendments, but was finally passed with full possession of all its money-borrowing powers, and without any depletion in the authority of the state road commission as to expenditures. In favor of the bill it was stated that the motor vehicle license fees would easily suffice to pay both the capital and the interest of the bonds and that there would be no resultant property tax. According to these figures, the vehicle fund in Utah in 1915 yielded \$25,950; in 1916, \$95,577, and in 1917, \$102,740. Each year

had shown an increase of approximately 10 per cent, and figuring the same increase throughout the twenty-year term of the bonds, the vehicle fund in 1936 would amount to over \$634,000. The total accumulated during the period would be \$5,856,000, and allowing for the 6 per cent for tags, etc., which would come to \$351,000, the cumulative fees would show a grand total of \$5,515,227, all of which would be available toward the extinction of the loan and its interest. The house bill, by Raleigh, creates a state road commission consisting of the attorney general, the state treasurer, the governor, the secretary of state and the state road commissioner, was passed by the senate. The University of Utah and the Agricultural college are represented on the commission at the present time. The representatives of these institutions have been unable to give much time to their road commission duties, it was explained, and the change in the personnel would achieve a full attendance at meetings. The new incumbents will be the state treasurer and the attorney general.

City to Initiate Paving Plans.

Hutchinson, Kan.—The paving petition hereafter will be unnecessary in Hutchinson. The city commission, which heretofore has required petitions before passing paving resolutions, has decided to reserve this policy, and hereafter paving will be initiated by the commission, subject to majority remonstrance. This new policy will put the burden of circulating petitions on the remonstrators, and will do away with the cross-fire of petitions such as the commission has lately experienced.

SEWERAGE AND SANITATION

City and County Health Work Combined.

Walla Walla, Wash.—Union of the city and county health offices has been effected by the passage of a resolution by the city commission. Under the ruling, Dr. R. W. Smith, county health officer, succeeds Dr. C. E. Montgomery as head of the city health department. Dr. Smith will hold the position of city health officer without pay, while Mrs. Elizabeth Soule, county nurse, will be deputy city health officer, receiving a salary from the city of \$40 per month. Mrs. Soule will continue her duties as county nurse, taking care of both the city and county work. The action was taken upon the instigation of mayor Toner, who has had the matter under consideration for some time past.

Sewer Extensions in San Antonio.

San Antonio, Tex.—Installation of pumps and other equipment for the Concepcion road sewer pump house has been completed and the district is now being served. This will mark the completion of the sewer extensions contemplated and provided for out of the \$800,000 in bonds voted in 1913 and for which plans were prepared by engineer Samuel M. Gray of Providence, R. I. The work on these sewers was started in 1914 and the mileage added to the sewered area out of that bond issue is 72 miles, giving the city a total of 192.86 miles of sewers. Under the plans as prepared by engineer Gray, the sewer mains installed, including the 72-inch outfall, are sufficient to care for a city with a population of from 300,000 to 400,000 people and it is not thought any more heavy sewer construction will be required for years to come. There will, of course, be many extensions, but these, for the most part, will be of the smaller 8, 12 and 16-inch sewers to connect with the larger ones which now radiate into all sections of the city. The Concepcion road or Fair Grounds district is the only one where the system is not operated by gravity. It was found impossible to put in a gravity system without constructing a heavy main to connect with the outfall far below the city. This would have entailed the necessity of acquiring additional right-of-way, besides the high expense of building a great length of big sewer main. To obviate this it was decided to install a pump house near the Concepcion road. Although it would mean an annual charge, both for a man to operate the pumps and for the electrical current used, it was estimated that this would not be any more than the interest on the additional investment which would be required to extend the sewer

far enough to provide gravity service. To provide service for this entire district it will be necessary to raise the sewage about thirty feet. This is to be done by a series of pumps which were purchased through the San Antonio Machine & Supply Company from the Westinghouse Company. It is estimated that the cost of the pumps together with their installation will not exceed \$6,000.

Public Health Work of Medical Academy.

New York, N. Y.—The Public Health Committee of the New York Academy of Medicine has just published a survey of its activities during the five years of its work, beginning in 1911. The volume is a record of splendid civic labor in the cause of public health and may well serve as a model of efficient aid by a profession to a community. The whole range of public health and related problems is covered by the activities of the committee. Some work has been in the nature of emergency effort and other work has required long study and attention. One of the principal results of the work of the committee was the transfer of the quarantine station at the port of New York from state to federal control. The contagious disease hospitals, child hygiene and health publicity and the budgets of the health, hospital and charities departments of the city have received special study. The committee has maintained a bureau for collection of information; has actively cooperated with all public health activities in the city; has held meetings and conferences and has kept public health matters before the profession and the public; and has made researches and studies. Some of the other subjects reported on by the committee include: Health of school children, physical examination of city employes, street cleaning, milk, water supply, health insurance, clinics, harbor pollution, drug control, patent medicines and health legislation.

WATER SUPPLY

Expert Recommends Increased Rates.

Lowell, Mass.—F. A. Barbour, consulting engineer of the Lowell water department, in a letter to Commissioner George H. Brown, in reply to the latter's request as to whether in his judgment it is necessary to raise the water rates in Lowell in order to obtain the required income to meet the fixed charges and operating expenses of the water department, says that a 20 per cent increase will be necessary in order to meet the maintenance expenses and allow any leeway for improvements, which he considers absolutely necessary. Mr. Barbour has been retained as consulting engineer for the water department since 1912. Mr. Barbour's letter does not recommend any particular procedure in advancing the rates, whether the 20 per cent will be added by taking off the 10 per cent discount now allowed and adding 10 per cent to the rate, or whether the discount still will be allowed and the rates increased 20 per cent. The recommendation states: "The average yearly expenses of the department since 1910, not including extraordinary expenses, covered by loans, have been as follows:

Bond and interest account.....	\$68,700
Labor	103,700
Materials	50,100
Total	\$222,500

"The income during this period averaged \$224,720 a year, or just about sufficient to meet the yearly expenses. Since 1915 the boulevard purification plant has been placed in operation; coal, which from 1910 to 1913 averaged in cost \$13,600 per year, has advanced in price from \$4.75 per ton to \$6.40 per ton, and the costs of other materials have greatly increased. The following table shows the income of the department from 1910 to 1916:

1910.....	\$223,745
1911.....	223,704
1912.....	235,395
1913.....	213,113
1914.....	241,187
1915.....	231,169
1916.....	254,721

"The marked increase in 1916 is due to abnormal manufacturing consumption, and it cannot be safely assumed that the recent rate of increase will be maintained. If the average rate of increase from 1910 to 1916 is taken as the basis for estimating the income of the next four years, it will be found that this future income will approximate \$257,000 per year, or \$21,000 per year less than the estimated expenditure. It therefore appears from a comparison of the estimated expenses and income that without any allowance for unusual expenditures or for such improvements of the system as must from time to time be undertaken in order to keep the plant up to the proper standard, an increase of 10 per cent in the present rates is necessary." A number of improvements are urged, including: The extension of the boulevard well system should be immediately undertaken and a plant for the removal of the carbonic acid from the Cook well water, so as to render this water fit for use, should be installed. "The use for so many years," says the report, "of water containing large quantities of iron and manganese has resulted in the formation of deposits in the mains which, whenever stirred up by unusual drafts, render the water in the immediate vicinity unfit for use for some hours. While the quality of the water as it leaves the purification plant is beyond criticism, this periodic stirring up of these old accumulations in the mains will result in unsatisfactory water being furnished the consumers from time to time, until the deposits are removed. It is also true that the effective fire pressure in various parts of the city can be materially improved by removing the incrustation which, in many of the older pipes, materially lessens their carrying capacity, and something should be done in this direction each year in order that reasonable fire protection be maintained.

"For all these improvements above described, which I consider necessary for the proper maintenance of the department, not less than \$20,000 should be available from income. To provide for these improvements, and for the 10 per cent deficiency for maintenance, already estimated, a 20 per cent increase in present rates will be required. It should be noted in considering the reasonableness of rates that the present rates have held since 1894, since which date Lowell has in great part constructed its ground water supply, and more recently has provided a new distributing reservoir, new pumping station, new pumps and works for the purification of the ground water. The present rate of 18 cents per 1,000 gallons is equivalent to 43 cents per ton of water drawn from the river, pumped, purified and delivered into the houses of the consumers. Fifty-five gallons are furnished for one cent and the average daily cost to each person in Lowell is about $\frac{3}{4}$ of a cent. A comparison of the income and of the cost of operation in different cities does not prove much, because of the varying conditions to be met, but it is significant that while by the report of the Massachusetts bureau of statistics the average water works income of all the cities in Massachusetts with populations exceeding 25,000 people, was, in 1915, \$2.88 per capita, the income in Lowell was only \$2.06 per capita; also it appears that there were two cities in the state where the income collected per capita was less than in Lowell. On the other hand, while the average cost of operation in these same cities was \$1.07 per capita, the cost in Lowell was \$1.34 per capita—a condition perhaps explained by the present necessity of double-pumping in Lowell and the purification of the supply."

Frozen Mains in Duluth.

Duluth, Minn.—There have been more frozen water mains in Duluth this winter than during any other year in the city's history. Out of a total of 12,000 service mains in Duluth, nearly 600 have been frozen since the first of the year. Four machines were kept busy night and day thawing out frozen mains at a rate of about twenty every twenty-four hours for each machine. The frost was so deep in the ground that there is not likely to be any real relief until the spring thaws are well under way. Manager D. A. Reed of the water and light department said: "The department is not trying in any manner whatever to shift responsibility for frozen services to the patrons of the department, more than what has been the practice in the past, both under the gas and water company's management and the subsequent

management by the city. In fact, charges for maintenance of service are less burdensome in that the requirement that a patron shall maintain at his own expense, the street service at the expiration of ten years has been abolished and the department now furnishes a new service free of cost to the patron whenever the service becomes unserviceable. Still further than this, I would favor an ordinance, with certain conditions, transferring the entire care and responsibility for all services from the main to the meter to the department, instead of dividing the responsibility as at present. It is an awkward place to divide responsibility and it is often more difficult to locate which side the trouble is on than it is to repair it."

New Equipment for Waterworks.

Chisholm, Minn.—With the installation of a new 75-horsepower, 700-gallon-per-minute, electric-driven pump at the village water works, the village is now prepared for any emergency which may arise that would draw heavily on the water supply in the tank. The installation of the new pump gives the waterworks three pumping units, the others being a 500-gallon-per-minute motor-driven centrifugal pump and an 800-gallon steam duplex compound. The three units are capable in emergency of handling 2,000,000 gallons per day. According to C. J. Sullivan, superintendent of the waterworks, this winter has been one of the most severe tests on the local water system which has occurred during the last ten years. Frost has penetrated, it is said, to a depth of between eight and nine feet, and the drain on the water supply has been in excess of 1,000,000 gallons per day, due to the consumers letting water run to prevent pipes from freezing. "No restriction has been placed on this waste of water," says Mr. Sullivan, "for we see where it is a great deal cheaper to pump for waste than it is to thaw pipes."

STREET LIGHTING AND POWER

Proposes Municipal Lighting System.

Portland, Ore.—Commissioner Will H. Daly, of the department of public utilities, has prepared a detailed report of the proposed municipal electric lighting system for lighting the streets and public buildings of the city. He recommends that the city attorney be instructed to prepare a charter amendment to be presented to the voters of this city at the municipal election in June, providing for the issuance of \$1,777,000 in bonds for the installation of the system. Of the proposed bond issue, \$777,000 is for the generating system and transmission lines and \$1,000,000 is for the installation of a modern system of street lights in Portland. He further recommends that the charter amendment "be so drawn that the system will be self-supporting." Engineers of the water bureau have been engaged in making surveys and calculations for the proposed system for months in connection with their work of conserving the city's water supply in the Bull Run, and full details of their conclusions are set forth in the report. They estimate that fully 5,000 horsepower of electric energy can be developed in a hydro-electric plant, by utilizing the power that is available in the stream. They propose to take the water from the stream thirteen and a half miles above the headworks and carry it through a flume to a reservoir, from which it will drop 666 feet to the wheels in the power station through a system of penstocks. From the power station the current is to be transmitted to the city by transmission lines, thirty miles long. In his report Commissioner Daly sets forth that the city is now paying approximately \$200,000 a year to the Portland Railway, Light & Power Company, under contract for lighting the streets and public buildings in the city. There are 3553 arc lights now in service and he says the system is becoming obsolete and unsatisfactory. He favors the installation of a more modern system of lighting. He also believes the city should take over the maintenance of all downtown street post lighting now being maintained by merchants and property owners. With 2500 of the horsepower which may be generated in a municipal plant, he says he will be able to give Portland 5000 arc lights or their equivalent for the same amount of money that is being paid for the illumination the city is now receiving, and that the rate for illuminating the public buildings with incandescents

can greatly be decreased for the sum now being paid for this service. The surplus 2500 horsepower of energy he proposes selling for lighting or power purposes. He suggests that the rate for residence lighting could be fixed at 5½ cents per kilowatt hour for the first 45 kilowatt hours, and 2 cents for each kilowatt hour over 45. For business lighting he suggests a flat rate of 4½ cents per kilowatt hour could be charged and 3½ cents for power purposes. With the amount now being paid by the city for illumination and with the sum which may be received from the sale of only 30 per cent of the surplus power, there would be an income for the lighting fund each year of \$384,770. He estimates the expense of operation and maintenance, including sinking fund and interest on bonds, at \$327,682, which would leave a surplus and profit from the plant of \$57,088 a year; and if the entire surplus of power was sold, the profits would be much larger. Daly recommends that the proposed bonds shall be serial bonds to run for a term of 22 years, one-twentieth to be retired each year after the second year.

Kansas Natural Gas Troubles.

Kansas City, Mo.—A conference between city officials of a number of Kansas cities, officials of distributing companies and the Kansas Natural Gas Company, resulted in no definite action as to reduced rates or better service. The rate proposed by the gas men astonished the city officials. "To give good service we should have 75 cents for cooking and lighting, and 45 cents for heating," said J. W. Dana, manager of the Kansas City, Kansas, Gas Company. City attorney Harley of Lawrence asked why these rates should not be reversed, fixing 45 cents for lighting and cooking, and 75 cents a thousand for all gas used for heating purposes. T. F. Doran, representing the distributing company at Topeka, told how the local companies throughout the district were making sacrifices and losing money in a spirit of service to the people. At the close of the meeting a sub-committee was appointed, which tried to agree on a line of action. The members of the committee were Mayor Edwards of Kansas City; J. E. House of Topeka; C. W. Green of Kansas City, Kansas; Nelson Case of Oswego, and J. F. Lee, public utilities commissioner of Joplin.

Previous to the conference, the Kansas Consumers' League, of Hutchinson, wrote to the members asking for immediate action for improved service. The letter said in part:

"If any new arrangement is to be made, then we demand that the company shall commit itself to an ironclad agree-

ment that, in event of the service remaining bad, or, being improved and then turning bad again, no bills shall be collectable, if disputed, until an adjustment shall be arranged and that meantime, pending a settlement, gas supplies shall not be shut off. We also demand that, as in the case of insurance companies, the company shall be compelled to lodge with the state a material fund, accompanied by a well defined agreement, that will protect consumers. We protest against a technical basis of measurement such as the company is trying to inaugurate under the guise of protecting consumers. In Hutchinson, at present, the technical features of the local franchise are so much waste ink, in so far as they serve any protective purpose. We suppose that in other cities, as here, the city officials are lacking in technical knowledge and somehow or other fail to remedy the neglect. We urge therefore that such pitfalls be avoided. We urge that any new deal shall provide for a small arbitration body in each city instead of a technical basis of measurement. When consumers, as a whole, get fuel they know it and they are willing to pay for it. When the service, generally, is abominable everyone knows it. Our consumers want, for the future, some reasonable body to which they may submit their grievances and want that body to have power to adjust matters. They do not want to be told in the future that their senses have deceived them."

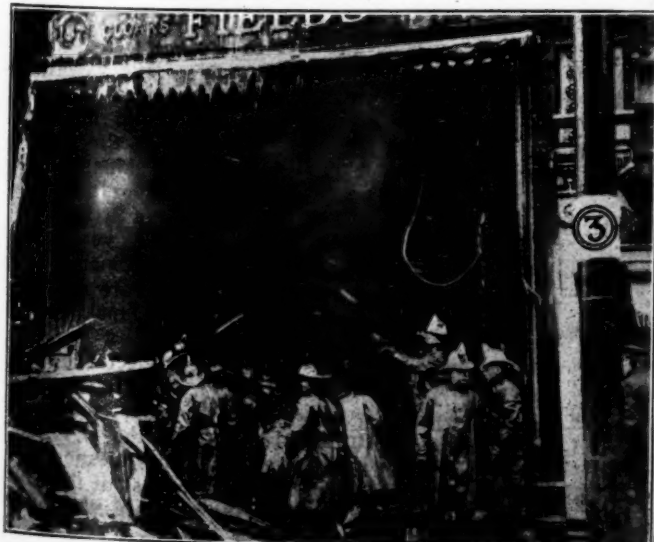
FIRE AND POLICE

Five Firemen Killed by Floor Collapse.

Detroit, Mich.—Five firemen were killed and one man was injured when the floors of a big store building collapsed in a difficult early morning fire and buried the men in the vestibule and doorway as they were about to leave. Without the snap of a timber as a warning, the show window vestibule became a charnel house of twisted metal and smoking debris which buried the five men. Seven were in the death trap an instant before the upper floors of the five-story building, weakened by flames, slid downward. One was hurled almost to the sidewalk line and escaped with minor injuries, while the seventh man, pipeman Joseph A. Kelly, of Engine 30, stepped out of the fatal doorway to "feed" more hose to his comrades, in obedience to orders, at almost the instant the floors fell. He escaped uninjured. Chief Timothy E. Callahan, of the first battalion, acting chief at the fire, chief Broderick being in charge, had left the ill-fated little squad inside the entry way only a moment before, without a suspicion of danger being so imminent. He had told them to "take a shot at the elevator shaft, and then back out." The dead are: Captain Alexander Cockburn, Ladderman Oscar Locke, and pipemen Otto A. Mattick, William Schill and Alonzo F. Raymond.

SCENES AT THE FIRE WHICH COST THE LIVES OF FIVE DETROIT FIREMEN.

Courtesy, Detroit (Mich.) Free Press.



For hours the firemen and police worked at the debris to get the bodies out. Two other firemen had been badly hurt about twenty minutes before in a fall from a ladder. Chief inspector Dupont, of the department of buildings, after examining the ruins of the Field building, declared that he was at a loss to explain the sudden collapse of the floors, except on the theory that the fire had spread to each floor and so weakened each one that the upper floor carried the others down with it, without resistance. Captain Cockburn was one of the best known men in the department, having entered the service in 1899. The fire did a total damage estimated at \$350,000. Architects and building experts were appointed to investigate the cause of the collapse. The accompanying illustrations show the blaze and the fatal doorway with the men hacking away to recover the bodies of their dead comrades.

Inspection of Fire Hazards.

Lima, O.—Lima is reported to be cleaner and to have fewer fire hazards than any municipality of its size in the state, according to the results of a two-day investigation of fire hazards by seven assistant state fire marshals and fifty investigators of the Ohio Fire Prevention Association. The inspectors averaged twenty inspections each day, a total of approximately 2300 Lima buildings being examined. About 250 complaints were reported, many being minor in nature, and some were corrected immediately by property owners. It was pointed out that of forty towns within a radius of fifty-five miles only one could give Lima aid in time of danger from fire. Of the forty towns with water works and modern fire apparatus in this part of the state only the village of Columbus Grove has hose that will fit the Lima water hydrants and hose connections. To correct that fault will not cost Lima one cent, Edgar T. Lyons, member of the Fire Prevention Association, declared. The Ohio association, he said, will lend the city the necessary tools to make all hydrant and hose connections standard. Regular members of the fire department, without added expense to the city, could do the work.

Chlorine Overcomes Many in Big Fire.

New York, N. Y.—Five large drums containing the deadly gas chlorine were wrecked in a fire which started in a chemical laboratory, and forty-eight firemen, among them three battalion chiefs, who entered the building or attempted to scale the walls with ladders, were overcome by the fumes before the blaze was under control. The damage was estimated at \$250,000. The gas penetrated a moving picture theater adjoining the burning building, where about five hundred were attending a performance. Police, who were on the scene early, explained what had happened to the audience and directed them to walk out slowly. They left the theatre without excitement. The street for 500 feet each way was filled with the fumes of the poison gas, and the police lines established scarcely were needed for the first half hour to keep back the huge crowds. At times as many as a dozen firemen were stretched out on the sidewalks. Two firemen were taken to the hospital and one of them later developed pneumonia, which is frequently an after-effect. The battalion chiefs overcome were Patrick J. Graham, Martin J. Callaghan, and Owen McKiernan. The latter went over twice before he gave way. Although the blaze was of little consequence when discovered, it wrecked the building, as the majority of firemen were unable to remain near it for more than a few minutes at a time until the gas fumes had passed away. Little effective work was done until the arrival of Captain McElliott and the members of the rescue squad, who were supplied with gas helmets, and for some time they had to devote themselves to the task of getting their less fortunate comrades to places of safety. The men were taken to improvised hospitals, where they were given the treatment for chlorine gas poisoning by a corps of hospital surgeons under the direction of Dr. H. M. Archer of the Fire Department. They found some of the firemen in the lower hallways and on the stairs, too weak to drag themselves out. Some of the men were kneeling on the floor, others were stretched out at full length. All were unable to shout for help, as the gas had burnt their throats.

GOVERNMENT AND FINANCE

Kansas City Defeats Manager Plan.

Kansas City, Mo.—The proposal for a new charter for Kansas City was voted down at a special election by an almost even vote, the negative vote having a majority of about 50. A four-sevenths majority was necessary for passage. The proposed charter called for a simplified form of city government along the lines of the city-manager plan. Under the plan, ward lines were to be abolished and city government directed by an administrative board instead of the city council. Approximately 32,000 votes, about half those registered, were polled. The day after the election mayor George H. Edwards announced that he expected soon to name a board of freeholders to draft a new city charter to be submitted to the voters for adoption as quickly as it could be prepared. Mayor Edwards declared he would recommend that the freeholders "correct the many errors in the defeated charter, embody the good features of it and retain the provisions of the present charter that years of experience have proved to be good, providing a simple but safe form of government." The charter was opposed by mayor Edwards and factions of both the larger parties.

Utility Rate Bill Vetoed.

Topeka, Kan.—Gov. Capper exercised his veto power for the first time this session of the legislature, when he disapproved a bill providing that any changes in rates filed by any public utility with the public utilities commission should become effective thirty days after being filed, unless suspended by the commission. Under the present law the utility must first show the commission that a proposed increase is reasonable before a new rate can go into effect.

Decides on Commission Form Case.

Beverly, N. J.—The supreme court at Trenton has denied an application for a mandamus to compel the authorities of Beverly to call an election to pass on a proposed ordinance creating a board of excise commissioners for that city. The most interesting point decided was that the legislature, by providing for the initiative in the Walsh commission government act, making it possible to change fundamentally the scheme of government with power concentrated in the commissioners, did not intend to authorize the power to be scattered among different boards. It was held that the act providing for the establishment of excise departments had been superseded by the Walsh act in cities adopting the commission form of government.

Vote in Favor of City Planning Board.

Flint, Mich.—Six proposed amendments to the charter were approved by good majorities in excess of the required three-fifths vote at a special election. One of the most important amendments dealt with city planning, and the question, "Do you favor creating a city planning board who shall have power and whose duty it shall be to consider and report upon the plan of all new public ways, parks and streets, openings, vacating and closing of streets, lanes and public places, the design of public buildings, bridges and other public structures, and of the extension of pavements, sewers and water mains, the approval of all plats and subdivisions and of all other public improvements in the city of Flint?" was answered in the affirmative by 4045 votes in favor to 1465 against. The proposition "fixing the annual salary of mayor at \$2500 per annum, of aldermen at \$400 per annum and \$2 for each committee meeting not exceeding fifty per year, and authorizing the common council to fix by ordinance the salary of all other city officers," received a vote of 3400, against 2128. A vote of 3959 to 1643 favored "making the mayor the chief executive officer of the city, a member of all boards, commissions and committees elected or appointed under the charter, giving him the power to take part in their discussions and vote at their meetings, requiring him to devote his time to the business of the city, and fixing his salary at \$2500 per annum." The question regarding "fixing the limit of bonded indebtedness of the city at not exceeding seven per cent of the assessed valuation

of the real and personal property and providing that the common council may issue bonds not in excess of such limit for the purpose of raising money to provide for extensions of water mains of the water works system of the city, whenever such extensions shall be recommended by the board of water commissioners upon their estimate showing that such water works extensions will yield an annual revenue of not less than fifteen per cent of the cost thereof, or whenever the extension of such water mains shall be rendered necessary to permit the laying of pavements, or such extensions shall have been ordered by the board of health of the city," was voted upon favorably by 3916 to 1406. The other amendment dealt with election regulations.

Commission Form Loses.

Iowa City, Ia.—By a vote of 899 to 747 the proposition to substitute the commission-manager plan of city government for the council and mayor system in Iowa City was lost at a special election. The vote total, 1646, was just a little more than half of the complete city vote. Two wards out of five gave a majority in favor of the plan. Four years ago the proposition to adopt the commission form of government for the city was lost by a majority of 195 against the proposal.

"Greater Knoxville."

Knoxville, Tenn.—Following the passage of a bill through the legislature and signature by Governor Rye, the city will in a few weeks extend its boundaries and become "Greater Knoxville." A very effective campaign was carried on by a number of city officials and prominent business men of the city. The population of the city, it is estimated, is to be more than doubled. City officials have already begun work on the problems involved, including changes in accounting methods and those of policing the sparsely populated outlying sections of the annexed suburbs.

Commission Plan Adopted.

Maplewood, Mo.—Maplewood has adopted the commission form of government at a special election by a vote of 415 to 387. The new plan is expected to save the city more than \$1600 in salaries the first year. Nineteen elective offices are eliminated, as follows: mayor, \$120; eight aldermen, \$60 each; street commissioner, \$600; building commissioner and director of sewers and plumbing, \$400; city attorney, \$900; collector, fees of approximately \$900; assessor, fees \$100; treasurer, \$50; city clerk, \$1080. The duties of these offices will be assumed by three commissioners and their assistants. They will serve without salaries the first year. Later they may vote themselves salaries if they see fit. Nominations for commissioners will be made at a primary. They will be elected at the general election, April 3. The six candidates receiving the highest number of votes at the primary will be placed on the ballots. Two will be candidates for mayor and the other four for commissioners. The three elected will govern the city for a year, with the mayor acting as chairman of the commission. Mayor H. G. Fink has announced himself in favor of the new plan. O. N. Pier, commissioner of buildings, streets and sewers, was an active supporter of the proposition.

County Manager Charter Defeated.

Napa, Cal.—The proposed county charter was defeated by the voters of Napa County by a three to one vote. The provision in the charter for a business manager and the proposed increased appointive power for the supervisors are declared responsible for its defeat, although, if adopted, the constitution provides that it may be amended at any time by a majority vote or it may even be surrendered by a two-thirds vote. It was estimated that \$10,000 a year would be saved in salaries under the charter plan of combining a number of offices. Under the proposed charter, five supervisors would be elected at large and would receive a salary of \$50 a month. These would appoint a business manager who would be ex-officio purchasing agent and public administrator and receive a salary of \$250 a month. The supervisors would have power to name the road engineer, who has direct charge of all construction of highways and bridges and of the business manager, who would have

general supervision of all county offices. Under the charter the office of auditor was made one of great importance and an elaborate budget system was provided. The auditor and the business manager would fix the budget after each county official submitted to them the amounts necessary to run their several offices during the year. This budget would be submitted to the supervisors, who could lower it, but not raise any of the estimates. A uniform system of bookkeeping was also required by the charter. The purchase of all county supplies, including those for all schools, would have been in the hands of the purchasing agent. That taxation should not be rapidly increased except in case of great public danger or emergency was provided in the charter. In 1918 the supervisors would not be able to raise more than \$260,000 by taxation and in each succeeding year the amount would not be increased above the amount raised during the previous year by more than three per cent. The tenure of present county officials was not affected by the charter, and provisions of the state constitution regarding the initiative, referendum and recall were made a part of it.

STREET CLEANING AND REFUSE DISPOSAL

Garbage Contract Upheld by Court.

Jersey City, N. J.—Justice Swayze has dismissed the writ of certiorari granted by justice Parker to two protesting taxpayers to review the action of the city commissioners in awarding to Thomas Harrington Sons & Co. a five-year contract for the removal of the city's ashes and garbage. The contract, which was awarded Jan. 2 at a figure in excess of half a million dollars, was opposed by the taxpayers on the ground that the specifications were arbitrary in several provisions, particularly that regarding the penalty for violating the eight-hour law, and that the successful bidders "were recipients and beneficiaries of special information that was not given to the other four bidders." Justice Swayze in dismissing the writ said that he failed to see how the interests of the taxpayers had been injured by the award or would be injured by it. The case will probably be appealed.

City Garbage Collection Begins.

Galesburg, Ill.—Commissioner of health Dr. F. G. Hall now has the city's garbage collection system in full operation. At the present time the garbage will be collected once a week, but arrangements will be made for more frequent collection as the system is perfected. The working of the new system has been quite carefully planned out and will fill what has been a great need for years.

Reorganizing Street Cleaning Department.

Eric, Pa.—With the motorization of the city street cleaning department before April 1, it is estimated that twenty-four men and eight wagons will be eliminated, with a probable saving to the city of \$50 a day. A Tiffin motor-driven flusher is to be bought. With the installation of this apparatus, for the first time in the city's history all of the seventy-five miles of paved streets will be washed regularly, it is said. Street director W. D. Kinney plans a readjustment of his entire department. The flusher will be worked eighteen hours a day in two shifts, cleaning the business section daily, while the residential streets will be flushed weekly. The flusher is claimed to wash twenty to twenty-four miles of streets in eighteen hours at a cost of about 75 cents a mile. A patrol system of picking up will be adopted, each man or "blocker" following the flusher to be given about two miles of gutter to clean. Wagons will collect the gutter scrapings from every block. Operation of the machine requires one man. Services of the thirteen white wings on State street will be retained according to the plan. The reduction in expense will come by the elimination of half of the sixteen pickup wagons used in the four street districts. Each wagon requires three men and with the dropping of half the teams twenty-four men will be discharged. The city hires the teams and is now paying \$6 a day, but has been notified of an increase to \$7 from April 1. The laborers get 25 cents an hour and

are after a raise to 30 cents. Mayor Kitts estimates that in addition to the white wings the city is spending \$88 a day on wagons and helpers in the street cleaning department.

Cost of Street Cleaning.

Oshkosh, Wis.—According to figures compiled by city comptroller and councilman Florian Lampert, the total amount expended for labor in oiling, sprinkling, flushing and sweeping streets during the year ending December 31, 1916, was \$22,303.21. The amounts charged to the several accounts were: Sweeping, \$15,966.21; sprinkling, \$4,398; flushing, \$1,389; oiling, \$550. Cost of the water and oil used is not included in these figures. Last year the total mileage of streets oiled was 14.6 miles and the total labor cost for oiling was \$37.67 a mile. The mileage flushed was 7.67 miles and the labor cost was \$181.10 a mile. The sprinkling mileage was 17.14 miles and the labor cost was \$256 a mile. The sweeping mileage was 22.27 miles and the average cost a mile was \$717. In the cost of sweeping, the several items were: Pay of sweepers, \$12,045.99; repairs on brooms, \$171.80; new brooms, \$104.42. The total number of miles swept by the district men was 8.42 miles and the mileage swept by the "white wings" was 13.85. The average cost a mile of streets swept by the district men was \$432, while the average cost of sweeping by "white wings" was \$879. The average cost a yard of the total sweeping was four cents. The labor cost includes, of course, the use of teams for the sweeper. The commission council has been studying for some time the problem of reducing the costs, and it is believed that a considerable saving would be effected in the long run by investing in new and up-to-date machinery and changing the methods somewhat. It is now proposed to purchase a motor-driven sweeper and a combination motor-driven sprinkler, oiler and flusher. Under bids recently received these two machines could be purchased for approximately \$11,000.

TRAFFIC AND TRANSPORTATION

City Revokes Street Car Franchise.

Billings, Mont.—Alleging failure to live up to the terms of its franchise on the part of the Billings Traction Company, which operates the local street car system, the city council has declared it revoked. Efforts were being made to effect a sale of the property, but the council decided that it had been patient too long.

New York's Traffic Problems.

New York, N. Y.—The Citizens' Union has joined other organizations in asking the appointment, by the Board of Estimate, of a City Traffic Commission. William Jay Schieffelin, chairman of the union, has written to the board calling attention to the dangerous traffic conditions in the streets, and expressing the belief that permanent relief can be obtained only through the formation of a comprehensive plan by a commission composed of public officials and other citizens, who have made a careful study of conditions. Mayor Mitchel recently expressed himself as favoring such a commission to work out a system of traffic zoning just as the Committee on City Plan worked out the zone plan of building restrictions. Police commissioner Woods, in a recent letter to the mayor, proposed what would amount to a revolution in the handling of the traffic on Manhattan Island, with such innovations as night deliveries of merchandise and the removal of elevated railroad pillars from important roadways. Mr. Woods favors the creation of a traffic commission. His recommendations are based upon these facts: The number of pleasure automobiles increased from 86,000 in 1915 to 116,000 in 1916, and commercial motor vehicles increased in number during the same period from 14,000 to 21,000. There are now 214,096 vehicles, including those horse-drawn, in the city, while many thousands more enter and leave daily from adjacent territory. All told, 659 persons were killed in street accidents, 281 of them children, during the last year, and 2,300 were injured. Commissioner Woods makes these suggestions: "Open up and make available all north and south arteries of travel. Remove elevated pillars from the roadways and place them on the sidewalks on the curb line on the avenues carrying these

LEGAL NOTES

A Summary and Notes of Recent Decisions— Rulings of Interest to Municipalities

Street Excavation—Damage by Seepage—Liability.

(N. Y. Sup.) A company excavating in a street to repair its own conduits, though authorized to do so by the city, is liable to the owner of a stock of goods damaged by water seepage due to the excavation, regardless of its negligence.—*May v. New York Edison Co.*, 161 N. Y. S., 886.

Obligation to Grade or Improve All Streets.

(Minn.) A city is not obliged to grade or improve all platted streets, but if an ungraded street is frequented by travel, of which the city has notice, it must keep such street in a reasonable safe condition.—*Miller v. City of Duluth*, 159 N. W., 960.

Street Improvement—Width to Be Improved—Condition.

(Minn.) A city is not generally bound to improve for travel the whole width of an outlying street, but it must not create or suffer a pitfall within the traveled portion or so near thereto that a traveler exercising due care may fall therein.—*Miller v. City of Duluth*, 159 N. W., 960.

Driving Automobile—Negligence.

(N. Y. Sup.) Driver of automobile, who, at rush hour in evening, without sounding horn, drove his car into a narrow space between the curb and a trolley car standing to drop and take on passengers, was guilty of negligence.—*Sternfeld v. Willison*, 161 N. Y. S., 472.

Unguarded Excavation in Road—Negligence.

(Minn.) It is negligent for a city to permit an excavation four feet deep in the middle of a traveled road with the bank above the excavation only sixteen feet wide without guard or railing.—*Miller v. City of Duluth*, 159 N. W., 960.

Eight-Hour Ordinance—Validity.

(Ohio) Under Const. art. 2, § 37, a city eight-hour ordinance for workmen on public work is not invalid as in conflict with general laws, under Const. art. 18, § 3, though taking effect before 103 Ohio Laws, p. 854, § 3, previously enacted, relating to the same subject.—*Stange v. City of Cleveland*, 114 N. E., 261.

structures. Widen two avenues by reducing the width of the sidewalks six feet on each side. Construct the much-discussed improvements in Park avenue by building a ramp on the east side of the avenue at Thirty-third and Thirty-fourth streets, building the connection around the Grand Central Station, and removing the park plots in the centre of the roadway between Thirty-fourth and Ninety-seventh streets. Relieve the awkward situation in Central Park West from Columbus Circle to 110th street by reducing the width of the sidewalk from 27 feet 7 inches to 6 feet 7 inches, which would afford a space for vehicles on the easterly side of the easterly car tracks." In addition to these physical means of relief, Mr. Woods advocates and recommends for the consideration of the proposed commission the working out of a plan of effective co-ordination between elective and appointive departments that have to do with city traffic, such as the public service commission, the borough presidents' offices, the police department and the dock department. In this connection he points out that the police department, though charged with the duty of regulating traffic, has nothing to say about the opening of streets or the giving away of parts of them for building purposes. Another thing he wants done is to get the co-operation of merchants and work out a plan whereby deliveries in certain zones could be done at night, thus relieving the streets of heavy, slow-moving traffic during daylight rush hours. There has been discussion of making alternate east and west streets or alternate groups of such streets one-way arteries of traffic during rush hours.

NEWS OF THE SOCIETIES

Calendar of Meetings.

- March 26.**—COUNTY ROAD SUPERINTENDENTS AND ENGINEERS OF ONTARIO. Third annual conference on Road Construction, Toronto, Ont. W. A. McLean, Deputy Minister, Department of Public Highways, Toronto.
- April 10-14.**—DOMINION GOOD ROADS ASSOCIATION. Fourth Canadian and International Good Roads Congress, Horticultural Building, Ottawa, Ont. Secretary, George A. McNamee, 909 New Birks Building, Montreal, P. Q.
- April 16-18.**—PORTLAND CEMENT ASSOCIATION. Spring convention, Palace Hotel, San Francisco Cal. Secretary, 111 West Washington street, Chicago, Ill.
- April 17-19.**—TRI-STATE WATER AND LIGHT ASSOCIATION OF THE CAROLINAS AND GEORGIA. Seventh annual convention, Macon, Ga. Secretary-treasurer, W. F. Stieglitz, Columbia, S. C.
- April 17-20.**—UNITED STATES GOOD ROADS ASSOCIATION. Annual convention, Birmingham, Ala. Secretary, J. A. Rountree, Birmingham.
- April 18.**—AMERICAN WATER WORKS ASSOCIATION, FOUR STATE SECTION. Annual meeting, Philadelphia, Pa. Secretary, Charles R. Wood, 400 Chestnut Street, Philadelphia, Pa.
- April 18-22.**—NATIONAL CONFERENCE ON COMMUNITY CENTERS. Annual conference, Chicago, Ill. Secretary, John Collier, 70 Fifth Ave., New York.
- May 7-11.**—AMERICAN WATERWORKS ASSOCIATION. Thirty-seventh annual convention, Richmond, Va. Secretary, J. M. Diven, 47 State Street, Troy, N. Y.
- May 7-9.**—NATIONAL CONFERENCE ON CITY PLANNING. Annual conference, Kansas City, Mo. Secretary, Flavel Shurtleff, 19 Congress Street, Boston, Mass.
- May 8-10.**—NATIONAL FIRE PROTECTION ASSOCIATION. Annual meeting, Washington, D. C. Secretary-treasurer, Franklin H. Wentworth, 87 Milk Street, Boston, Mass.
- May 8-9.**—AMERICAN ASSOCIATION FOR PROMOTING HYGIENE AND PUBLIC BATHS. Annual convention, Pittsburgh, Pa. Secretary, J. L. Mason, City Hall, Philadelphia, Pa.
- May 28-June 1.**—NATIONAL ELECTRIC LIGHT ASSOCIATION. Annual convention, Atlantic City, N. J. Secretary, T. Commerford Martin, 29 West 39th Street, New York, N. Y.
- June 4-5.**—AMERICAN ACADEMY OF MEDICINE. Annual meeting, New York City. Secretary, Dr. Thomas W. Grayson, 1101 Westinghouse Building, Pittsburgh, Pa.
- June 4-8.**—AMERICAN MEDICAL ASSOCIATION. Annual meeting, New York City. Secretary, Frederick R. Green, 535 North Dearborn Street, Chicago, Ill.
- June 11.**—NEW YORK STATE CONFERENCE OF MAYORS AND OTHER CITY OFFICIALS. Annual conference, Buffalo, N. Y. Secretary, W. P. Capes, 25 Washington Ave., Albany, N. Y.
- June 20-30.**—AMERICAN SOCIETY FOR TESTING MATERIALS. Annual meeting, Atlantic City, N. J.
- Oct. 17-18.**—LEAGUE OF MINNESOTA MUNICIPALITIES. Fifth annual convention, St. Cloud, Minn. Secretary-treasurer, Richard R. Price, University of Minnesota, Minneapolis.
- Nov. 12-16.**—AMERICAN SOCIETY OF MUNICIPAL IMPROVEMENTS. Annual convention, New Orleans, La. Secretary, Charles C. Brown, 469 Transportation Building, Chicago, Ill.

New England Waterworks Association.

The March meeting of the association was held at the Hotel Brunswick, Boston, March 14. The executive committee met at 11:00 o'clock in the morning and lunch was served at one o'clock. Beginning at two o'clock

papers were read and discussed. William S. Johnson presented "Statistics Relating to the New England Waterworks Association"; Albert F. Ganz of Stevens Institute, Hoboken, N. J., discussed electrolysis, the troubles it causes and remedies that may be applied. F. F. Forbes, superintendent of the Brookline waterworks, spoke on "Cast Iron Pipe Joints."

American Waterworks Association. Illinois Section.

The ninth annual meeting of this association was held March 13 and 14 at the University of Illinois, Champaign-Urbana, Ill. The first session was opened with an address of welcome by Prof. C. R. Richards, dean of the college of engineering. Paul Hansen delivered his address as president of the organization and following this were the reports of the secretary and treasurer. W. J. Spaulding, commissioner of public property of Springfield, discussed "Operation of Municipal Combined Electric Power and Waterworks," and C. M. Roos, superintendent of the Cairo Water Co., spoke on "Seeking Better Insurance Classification for Small Cities." After C. L. Kohn of Elgin had presented a paper on "Experience with Meters at Elgin," there was round table discussion on meter department operation.

The afternoon session was an interesting one. Papers were presented as follows: "Some Costs of Maintenance of Motor-Driven Deep-Well Pumps," by M. L. Enger, assistant professor of mechanics and hydraulics, University of Illinois; "Ultra-Violet Rays, Advantages and Disadvantages in the Purification of Drinking Water," by R. R. Spencer, assistant surgeon, U. S. Public Health Service, Chicago; "Water Supply as Affected by Regulation," by Walter A. Shaw, State Public Utilities Commission of Illinois, Springfield; "Relation of the Railroad to the City Waterworks Plant," by C. R. Knowles, supt. water service, Illinois Central Railroad, Chicago. Following the papers there was round table discussion on the value and relation of laboratory control in the operation of water purification plants. In the evening the annual dinner was held.

At the Wednesday morning session five papers were presented and these papers were followed by a round table discussion on the financial side of the installation of house connections. These papers were presented: "Public Utilities and Public Health," by H. E. Barnard, State Food and Drug Commission, Indianapolis, Ind.; "A Municipal Waterworks Constructed and Operated Solely for Industrial Service," by Claude L. James, supt. Citizens Water Co., Mattoon; "Pure Water for Cities on the Great Lakes," by W. M. Lewis, mayor, Lake Forest; "Proposed Reorganization of the Illinois State Board

of Health," by Dr. C. St. Clair Drake, secretary, State Board of Health, Springfield; "Flow Measurement in a Collecting Gallery by the Chemical Method," by D. H. Maxwell, assistant engineer, with Alvord & Burdick, consulting engineers, Chicago.

Papers presented at the final session, at which officers for the ensuing year were elected, were as follows: "Sterilization by Liquid Chlorine and Hypochlorite of Lime," by M. S. Dutton, chemist, Central Illinois Public Service Co., Lawrenceville; "Some Tests on Motor-Driven Deep-Well Pumps," by Ira W. Fisk, associate in electrical engineering, University of Illinois; "Treatment of Public Water Supplies from Lake Michigan," by S. A. Greeley, hydraulic and sanitary engineer, Chicago; "Increasing a Water Supply," by H. M. Ely, supt. Interstate Water Co., Danville; "Some Typical Railway Waterworks Installation," by C. R. Knowles, supt. water service, Illinois Central Railroad, Chicago.

Sewer Contractors' Association.

The annual meeting and banquet of the Sewer Contractors' Protective Association was held at Cleveland recently. Officers elected for the ensuing year were: Joseph Winterbottom, president; W. J. Gawne, jr., vice-president; A. L. Connelly, treasurer, and Bruce W. Ernst, secretary.

The new executive committee is made up of Mr. Connelly, chairman; Thomas P. Egan, P. W. Graham, Walter P. Gibbons and George B. Hoag.

Following are the committees appointed for the ensuing year:

Legislative—Carl F. Adams, B. F. Sprague, R. F. Ward, E. P. Sprague, George Davis, Newark.

Semi-annual convention—P. R. Proctor, Asbury Park; B. F. Sprague, Jewell VanDyke.

Audit—George Davis, Newark; Henry Venino, Newark; A. J. Long, Orange.

Annual Convention—George Davis, Henry Venino, M. T. McGowan, Newark.

Exhibit—Carl F. Adams, Paul H. Jaehnig, J. T. Justinson, Paterson.

California Supervisors' Association.

The seventh annual convention of this association was held at Sacramento, February 20 and 21. Speakers at the opening session included Judge Peter Shields, who delivered the address of welcome, President E. E. Tretheway, Miss Bessie Silverton of Siskiyou County, State Librarian James Gillis and Miss E. L. McTate, director of the Tuberculosis Bureau of the State Board of Health.

The association went on record as being opposed to all seventeen of the bills before the legislature, making it mandatory upon boards of supervisors to employ the services of an engineer to take charge of the county highways.

A vote by counties was taken on the question and every delegate ex-

cept one in Orange County voted as being opposed to all of the bills of that style that might come up before the present session of the legislature.

The delegates went on record as being opposed to the passage of Sen-

ate Bill 985, which provides for the taking over of additional roads for the State Highway Commission and the increasing of the Commissioners' salaries to \$5,000 per year for each. The

(Continued on page 389.)

PROBLEMS CITIES ARE STUDYING WITH EXPERTS

Owatonna, Minn., is to construct a **REINFORCED CONCRETE BRIDGE**. The engineer is J. H. A. Brahtz, engineer, St. Paul, Minn.

Fairmont, Ill., is to make a number of **PAVING IMPROVEMENTS**. Lee Harper, 1413 State street, East St. Louis, Ill., is the engineer.

The Metropolitan Park Commission, Boston, Mass., is to construct a **BRIDGE** to cost \$350,000. The plans were prepared by John R. Rablin, 18 Tremont street, Boston, Mass.

Indianola, Neb., and Unadilla, Neb., are to construct **WATERWORKS**. The consulting engineers for both projects are Grant & Fulton, 509 Bankers' Life building, Lincoln, Neb.

A number of **PAVING IMPROVEMENTS** are to be made by Woodstock, Ill. The engineer for the work is Hugh M. Price, Hartford building, Chicago, Ill.

Baxter Springs, Mo., is to construct a **WATERWORKS PLANT**. Preliminary plans are being prepared by A. C. Moore, 417 Frisco building, Joplin, Mo.

PAVEMENTS to be constructed by Milan, Mo., are being planned by the Tuttle-Ayres-Woodward Engineering Company, Reliance building, Kansas City, Mo.

An **APPRAISAL** of the **WATERWORKS** of Reno, Nev., is to be made by the city. The experts retained are Burns & McDonnell, 400 Interstate building, Kansas City, Mo.

Monona and Harrison Counties, Ia., are to construct **DRAINAGE DITCHES** to cost \$500,000. The engineers for the project are the Towle Engineering Co., 1406 First National Bank building, Omaha, Neb.

The village of Fairport, N. Y., is making a number of **STREET IMPROVEMENTS**. The consulting engineer for the work is C. F. Fisher, 304 Ravine avenue, Rochester, N. Y.

In making extensions to its **SEWER and WATER SYSTEMS**, Madison, Ga., has the consulting engineering services of the Solomon-Norcross Co., 1625 Candler building, Atlanta, Ga.

The city councils of Madill, Okla., and Chekottah, Okla., are investigating the possibilities of new **WATER SUPPLIES**. They have retained the Benham Engineering Company, Oklahoma City, Okla., to make investigations and reports.

A **SEWAGE DISPOSAL PLANT** is to be built by Ripon, Wis. The engineer is W. G. Kirchoffer, 31 Vroman building, Madison, Wis.

A **SEWER SYSTEM** is proposed for Early, Ia. Plans are in progress by E. T. Archer & Co., 512 New England building, Kansas City, Mo.

Ackley, Ia., is soon to begin work on a number of **STREET IMPROVEMENTS**. M. Tschirgi, American Trust Building, Cedar Rapids, Ia., prepared the plans for the work.

Fearing pollution of its **WATER SUPPLY** by mine water, Ft. Smith, Ark., is having the question studied by the Kansas City Testing Laboratory, 1013 Grand avenue, Kansas City, Mo.

Neodesha, Kan., is to construct an intercepting **SEWER and DISPOSAL PLANT**. The engineers are Black & Veatch, 507 Interstate building, Kansas City, Mo.

Alliance, O., is to develop its **PARK SYSTEM**. Plans for the improvement are now being prepared by the American Park Builders, 140 South Dearborn street, Chicago, Ill.

A **WATER SUPPLY SYSTEM** to cost \$190,000 is to be constructed by Potsdam, N. Y. The consulting engineer for the work is Charles E. Perry, 36 State street, Albany, N. Y.

Rocky River, O., is to construct a **SEWER SYSTEM** at a cost of \$90,000. The consulting engineer for the work is R. Winthrop Pratt, Hippodrome building, Cleveland, O.

The Water and Sewer District at Eudora, Ark., is to construct a **SEWER SYSTEM and WATERWORKS**. The consulting engineer for the work is Xavier A. Kramer, Magnolia, Miss.

SEWERAGE SYSTEMS are to be constructed by Athens, Pa., and Sayre, Pa. The engineer for both these projects is R. R. Fernow, Weightman building, Philadelphia, Pa.

Wilton Junction, Ia., is to construct a **SEWER SYSTEM and DISPOSAL PLANT**. The engineers for the work are David G. Fisher & Co., Davenport, Ia.

Taylor, Tex., is considering the purchase and extension of the privately-owned **SEWER SYSTEM**. Henry Exall Elrod, Interurban building, Dallas, Tex., has been retained as consulting engineer to appraise the property and to prepare plans and specifications for the proposed improvements.

PERSONALS.

Ransome, E. L., pioneer in the field of reinforced concrete construction in the United States, died March 5, at his home in Plainfield, N. J., at the age of 73. He is recognized as having erected in 1887 and 1888 the first reinforced concrete building in the country, a factory for the Pacific Coast Borax Company, at Alameda, Cal. In the face of much opposition and inertia, he worked at his ideas and it is undoubtedly due to his missionary work that reinforced concrete principles were given such impetus as to result in their present universal acceptance. The effect on the growth of the Portland cement industry is remarkable. While in 1890, when Ransome began his propaganda, the production was only 300,000 barrels, it had increased to 36,000,000 barrels in 1905.

Mr. Ransome, it is said, was the inventor of more machinery for the purpose of mixing and placing concrete than were all the other inventors combined and was responsible for nearly all of the modern mixer machines. He was the inventor of the Unolithic method of building. He is also the co-inventor of the pneumatic concrete machinery, as he was the constructor of the first machine of that type in use in the world. As early as 1894 he published an important historical document on steel-concrete.

Personally, Mr. Ransome was said by those who knew him to have been one of the most lovable of men, with a very acute intelligence and a very strong physique. He remained actively engaged in business almost to the day of his death. He was beloved of all his employees and of everyone who had ever had any connection with him socially or in business.

Mandigo, Clark R., formerly assistant city engineer of Kansas City, Mo., has resigned as assistant engineer for the Portland Cement Association to accept the position of consulting engineer for the Western Paving Brick Manufacturers' Association, Dwight Building, Kansas City, Mo. He will have charge of the service and promotional department for the association, which operates over most of the territory between the Mississippi river and the Rocky Mountains.

Baldwin, William Henry, for nearly ten years deputy city engineer of Yonkers, died March 6, in that city. Mr. Baldwin was born in Nashua, N. H., and was a graduate of Dartmouth College in 1859. He had charge of municipal engineering projects in Memphis, Buffalo and Norfolk. In 1888 he was made engineer of the Yonkers water department, and when in 1908 the city was formed he became deputy city engineer.

The following mayors have been elected in Maine: Auburn, Ralph F. Burnham; Bath, John A. Small; Eastport, Fred E. Eldredge; Ellsworth, A. C. Hagerthy; Hallowell, John M. Robinson; Lewiston, Charles P. Lemaire;

(Continued on page 389.)

NEW APPLIANCES

Describing New Machinery, Apparatus, Materials and Methods and Recent Interesting Installations.

A NEW TIRE.

New Goodyear Cord Pneumatic for Trucks.

About four or five years ago, it is stated, it became quite obvious to the engineers of The Goodyear Tire & Rubber Company that no one style of tire would best meet all conditions in the motor truck industry. Trucks operating under different conditions needed different styles of truck tires. Some trucks were operated at high speed, others at low speed, some over smooth pavements, others over rough pavements, and still others on unimproved country roads. By analyzing these conditions it was seen that there was a need for a pneumatic tire for motor trucks larger and stronger than the pneumatic tires used on automobiles. Goodyear engineers began experimenting with large pneumatic tires, and after years of such experimenting succeeded in producing the "single pneumatic truck tire." These tires are made at the present time in four sizes, as follows:

Size.	Ideal load lbs.	Max. load lbs.
36x6".....	2,050 @ 90	infla. 2,275 @ 100
38x7".....	2,750 @ 100	infla. 3,000 @ 110
40x8".....	3,600 @ 100	infla. 3,925 @ 120
42x9".....	4,650 @ 120	infla. 5,000 @ 130

These tires were at first constructed in the fabric type only, and as soon as they were established on the market Goodyear engineers began experimenting with cord type construction, which they felt would give even greater satisfaction and longer mileage. These pneumatic truck tires in cord construction are not specially designed tires. They are built the same as cord tires for pleasure cars, but much larger and stronger, with greater numbers of plies of cords. They are made in the All-Weather tread, which is an acknowl-

edged factor in the prevention of skidding.

The tubes for pneumatic truck tires are constructed by the laminated process; that is, thin sheets of pure gum are built up layer upon layer, which construction prevents blisters, air holes and like defects so prevalent in tubes of ordinary construction. They are extra heavy and of a uniform gauge.

Regular Goodyear Ideal detachable rims are recommended for these pneumatic truck tires. These are of the same type of construction as automobile tire rims, but they are larger and heavier, and of the straight side type. "Cord single pneumatic truck" tires are built only in the straight side type.

It has been stated that experience would indicate that the following types of service should utilize pneumatic tires: Trucks of lighter models from $\frac{3}{4}$ -ton to $2\frac{1}{2}$ -ton, which are carrying any other fragile material; trucks operating at a high rate of speed over rough streets or roads; passenger carrying busses and fire apparatus. Pneumatic equipment, it is said, allows a motor truck to be operated at great speed with no greater injury to the mechanism of the truck. Pneumatic equipment helps also to reduce vibration to a minimum, lessen operating expense and increase the general efficiency of the truck. These qualities make this type of tire particularly adapted to fire apparatus service. The resiliency makes for comfort to the men and safety for the equipment. The speed possibilities are, of course, of prime importance in fire service.

These tires come in the All-Weather tread in sizes 36x6, 38x7, 40x8 and 42x9, with from 10 to 16 plies of cords, according to the size of the tire. The accompanying illustration shows a view of the tire and one of its cross-sections.

The new tire is the product of the Goodyear Tire & Rubber Co., Akron, Ohio.

STREET MARKING WHITE.

Hoosier Marking White for Traffic Control.

Growing cities—and few cities will admit they are not—are realizing increasing need of traffic control, especially in the more congested business sections. Traffic policemen are a good solution to the problems—but they are expensive. Other means of educating the public, on foot and in vehicles, to move in an orderly and safe manner are therefore very desirable. Signs and the use of painted guide lines are the most practicable. Lines marked in white are widely used now for marking crossing lines for pedestrians, safety areas for street car stops, parking spaces for automobiles and stands for cabs and jitneys and for directing traffic streams. Cities conducting a "walk-right" campaign find the white marking most effective as a silent reminder for safety.

The necessary qualities in such a marking medium are naturally distinctness and durability. The marking must stay on the pavement and not go with the wheels of the traffic—it must stay as clear as possible for as long a time as possible through rain, snow, mud and dust. It must be able to stand traffic. It must appear neat and distinct.

Hoosier street marking white is made for this particular purpose and it is claimed to have all the requisite qualities. It is economically and easily applied either with a brush or a marking machine and gives a clear and lasting line. It has been found effective, among others, by Herman Strodel, su-



NEW GOODYEAR CORD PNEUMATIC TIRE FOR TRUCKS.

perintendent of streets of Fort Wayne, Ind.

The guarantee accompanying the Hoosier marking white offers a money return if it does not outlast any other material used for the same purpose. The white described is the product of the Hoosier Paint Works, Fort Wayne, Ind.

INDUSTRIAL NEWS

Cast Iron Pipe.—Chicago—The American Cast Iron Pipe Company is the low bidder for 500 tons at Evansville, Ind.; the National Cast Iron Pipe Company for 250 tons at Oak Park, Ill., and the placing of 200 tons at Castlewood, S. D., is also noted. Quotations: 4-inch, \$45.50; 6-inch and larger, \$42.50, with \$1 extra for class A. Birmingham—An order for 500 tons for Dallas, Texas, was among those received last week. Customers compelled to have pipe in spite of high prices, and able to stand them, continue to come in with orders sufficient to maintain the standard of operations, but, in many instances, original specifications are considerably curtailed. Prices are up another \$1 per ton. Quotations: 4-inch, \$40; 6-inch and upward, \$37, with \$1 added for special lengths. New York—Municipal lettings are still few in number. Ogdensburg, N. J., opens bids March 15 on 500 tons of 6 to 16-inch. This appears to be about the only important letting now pending in this locality, but inquiries from private buyers are increasing. Prices are maintained. Quotations: 6-inch, class B and heavier, \$41.50, class A taking an extra of \$1 per ton.

Lead.—Lead continues strong despite more liberal arrivals from the west. Quotations: New York, 9.50 cents; St. Louis, 9.50 cents.

At the meeting of the directors of the Granite Paving Block Manufacturers' Association of the United States, Inc., held Feb. 27, at the Belmont Hotel, the following directors were elected: C. Harry Rogers, 31 State street, Boston; William Booth, 208 Broadway, New York; H. S. Lanpher, 90 West street, New York; Jos. Leopold, 233 Broadway, New York; Thos. Lahey, 31 State street, Boston; D. L. McLaren, Westerly, R. I.; H. E. Fletcher, West Chelmsford, Mass.; James Adamson, 208 Broadway, New York; F. T. Mason, Atlanta, Ga.; P. A. Wallenborn, Salisbury, N. C.; Thos. Woodruffe, Mt. Airy, N. C.

The Duplex Truck, which is now manufactured by the Duplex Truck Co., of Lansing, a million dollar corporation, is said to be the original four-wheel drive truck. For several years the Duplex truck was manufactured at Charlotte, Mich., with a small number of motor trucks being placed on the market each year. The development of the Duplex truck was watched, however, by several Lansing automobile

men, and a few months ago they organized a corporation and purchased the Charlotte factory. This company also controls the basic patent on the application of power to front wheels through external or internal gears.

The company's president and general manager, H. M. Lee, entered the automobile industry in the early days, being a graduate of the bicycle business. He was formerly associated with the Pope Mfg. Co., of Hartford, Conn., as a member of the sales department. Later, when the Pope Company began the manufacture of automobiles, he sold motor cars, and established agencies for the Pope Company in various sections of the country. Eleven years ago Mr. Lee became one of the important executives in the sales department of the Reo Motor Car Co.

Duplex trucks in U. S. army service, in lumber camps and oil fields, in engineering, mining and contracting service have been found particularly effective in hauling capacity loads without stalling.

Since Mr. Lee became head of the Duplex Company the capacity of the Charlotte factory has been trebled, and building operations are about to start in Lansing. When the new factory is completed the production will be increased to ten trucks per day.

The Metropolitan Paving Brick Company, Canton, O., announces the purchase of the brick interests of **The Bessemer Limestone Company**, Youngstown, O., thereby increasing the large capacity of the former company to the extent that it is now, it is claimed, the largest paving brick company in the world. By the terms of the purchase, the Metropolitan Paving Brick Company has acquired the huge brick kilns of the Bessemer Company, which are located at Bessemer, Pa., including hundreds of acres of paving brick shale. The purchase was under consideration for the past several months, and the Metropolitan Paving Brick Company takes charge of the additional factories as of March 1, 1917. The general office of the company will continue at Canton, O., as before.

The Goodyear Tire & Rubber Co., Akron, O., announces a number of changes in personnel of its organization. R. S. Wilson is now manager of the motor truck tire department. He began his Goodyear connection as an adjuster at the Detroit branch in September, 1912. About a year later he was transferred to the service department at Akron and became manager of the department in 1914. G. E. Brunner, recently appointed manager of the service department, succeeding R. S. Wilson, came to Goodyear in 1914 as assistant adjuster at Philadelphia. He was soon promoted to adjuster at Syracuse, N. Y., and in June, 1916, appointed special representative of the service department at Akron. Later he became assistant manager of the department. Walter R. Bliss has assumed the duties of manager of the

New York district. Mr. Bliss began his career with his present employers as manager of the mechanical goods department at Akron. Later he was made manager of the Boston branch, which position he has just left, after a four years' occupancy, to take up his new work in New York. C. W. Martin, Jr., has been appointed manager of the Southern district. In the earlier days of the automobile industry, Mr. Martin was one of the half dozen men, covering the entire South as a rubber and tire salesman. When the Atlanta branch was first created, he became its manager, and later, when other branches were established throughout the South, he was made district manager with headquarters at Atlanta. Here his work was so fruitful of results that he was called to Akron as manager of the motor truck tire department. This position he has held for the last five years. Now Mr. Martin comes back to Atlanta to take charge of his old district, which has grown to one of the most important districts in the company's entire organization.

The Dayton-Dick Company, Quincy, Ill., has just issued a new and neat folder containing two bulletins featuring the Hayton centrifugal pumps. Single-stage, double suction; multi-stage, single suction, and single-stage, single suction volute pumps are fully described and illustrated.

Wallace & Tiernan Co., Inc., 137 Centre street, New York, N. Y., manufacturing of chlorine control apparatus and scientific engineering specialties, announces the following changes in its organization, and additions to its technical staff: On March 15, a Chicago office will be opened in room 550, People's Gas Building, Michigan Boulevard and Adams street, Chicago, Ill., with Mr. C. A. Jennings in charge. Mr. Jennings is well known to water works men through his connection with the Bubbly Creek Filters of the Union Stock Yards, and his research work in the field of water purification, particularly along the lines of chlorination. Mr. H. K. Davies will be transferred from the New York office to Chicago, as assistant engineer to Mr. Jennings. Mr. J. C. Kaelber has been appointed to the technical staff as assistant engineer. Mr. Kaelber is a graduate of the University of Rochester and formerly connected with the Western Electric Company. Mr. R. V. Donnelly has also been appointed to the technical staff as assistant sanitary engineer. Mr. Donnelly is a graduate of Columbia University and formerly connected with the New York Continental Jewell Filtration Co.

The American-LaFrance Fire Engine Co., Inc., Elmira, N. Y., announces that it has received the following orders:

Berwyn, Pa., one Type 40 Combination chemical engine and hose car with junior pump; Council Bluffs, Ia., one Type 40 combination chemical engine and hose car with junior pump.

one Type 31 truck tractor; Coal Township, Pa., one Type 12 pumping engine and hose car, two Type 75 pumping engines and hose cars; Farrell, Pa., one Type 40 combination engine and hose car with junior pump; Millburn, N. J., one Type 14 combination service truck; New York, N. Y., twenty-five special pumping engines; Oakland Beach, R. I., one Type 40 combination with junior pump; Omaha, Nebr., four Type 12 pumping engines, five Type 14 service trucks, three Type 31 tractors; Rock Island, Ill., one Type 12 combination; Shamokin, Pa., one Type 12 pumping engine; Sheboygan, Wis., one Type 31 75-ft. aerial truck; South Bethlehem, Pa., two Type 75 pumping engines; Stillwater, Minn., one Type 75 pumping engine; Taylorville, Ill., one Type 40 combination with junior pump.

Recent Tests at Bureau of Standards.

—Numerous tests have been conducted during the past month at the United States Bureau of Standards. The routine work included the calibration of 27 water-current meters, 13 pressure gauges, 25 miscellaneous devices and 112 samples of various kinds of material, including lubricating oils, water, air, and steam hose, rubber valves, rubber and asbestos packing, dredging sleeves and rubber-covered wire.

NEWS OF THE SOCIETIES

(Continued from page 386.)

Supervisors believe that the people of California are opposed to granting additional power beyond the present.

Assemblyman H. B. Beam's bill, providing for the appointment of County Highway Engineers by the Boards of Supervisors, who can only be discharged when tried by an investigation board composed of State and county officials was read, because it was said to be a fair example of the bills before the forty-second session of the Legislature.

Discussion on the good obtained by county libraries took up a large part of yesterday afternoon's session. Supervisor William Russell from Yolo, was the champion for the library movement, and suggested that all counties not supplying their residents with free books should get busy and look into the matter. He also stated that manual training would probably be placed in some of the county schools during the next two years. He reported that it cost Yolo County about \$13,000 for its County Library. All of that amount, with the exception of about \$4,000 for salaries went for the purchase of books.

New Jersey Health Officers' Association.

Welcomed by Governor Edge, the eighth annual conference of state and local health officials was opened at Trenton, N. J., February 16. On February 17, the annual meeting of the New Jersey Health Officers' Association was held.

The first feature on the program was a symposium on the relation of the State Department of Health to local boards of health. This was partici-

pated in by assistant director R. B. Fitz Randolph of the State Health Department, D. C. Bowen, chief of the bureau of local health administration, and William G. Tice, acting chief of the bureau of foods and drugs.

The handling of milk for consumption in Newark was explained by Mr. Sharwell, who declared efforts in Newark were concentrated on getting clean and safe milk for the community. This had been the case since 1912, he said, when the present milk ordinance was adopted and the inspection force was increased to four so that dairies supplying the city could be scored, in accordance with the classification cards adopted to secure uniform methods of inspection.

The conclusion of the afternoon session was devoted to consideration of the proposed state sanitary code dealing with the organization of local health boards and communicable diseases.

By adopting a report of its legislative committee, the association went on record as favoring legislation of a drastic character for the better regulation of public health. The session, marking the close of the annual conference of state and local health authorities, was concluded by the election of officers for the ensuing year.

Health officer William J. Willsey of Perth Amboy was elected president, defeating Dr. Charles V. Craster of Newark. Other officers chosen were: vice-president James E. Brooks, Glen Ridge; secretary, Chester H. Wells, Montclair; executive committee, Dr. Charles V. Craster, Newark; Randolph Chandler, Plainfield; Y. Dudley Ballinger, East Orange; L. J. Richards, Elizabeth; John Hall, East Orange, and T. J. Duffield, Summit.

Pennsylvania Supervisors' Good Roads Rally.

This meeting will be held at Ebensburg, Pa., on March 28 and 29. The program is as follows:

Wednesday, 10:30 o'clock—Address of welcome, W. A. McGuire; response, Dr. Harry Somerville; reading of minutes, appointment of Executive Committee, Resolutions Committee and Nomination Committee; explanation of questions; roll call.

Afternoon, 1:30 o'clock.—Opening of question box; "A Better Organization of Supervisors of Cambria County," Webster Mosholder and Thomas H. Myers; opening discussion by convention; "Agitation for Good Roads a Benefit," J. F. Boyer and W. H. Killen; discussion by convention; "Is It Prudent for the Supervisors to Let the Maintenance of Sections of Their Roads by Contract?" M. J. Bradley and James Davis; discussion.

Thursday, 9:30 o'clock.—Opening of question box; address by W. K. Bechtel, Supervisor from Bedford County; discussion; "How to Make the Best Township Roads with Materials at Hand," T. P. Burns and W. H. Beers; discussion by convention; report of Committee on Resolutions; greetings

from Bedford County, by Emory D. Claar; discussion, "The Need of Cooperation Between Supervisors and Their Constituents," by D. H. Weimer and Edward Costlow; report of Nominating Committee.

Afternoon, 1:30 o'clock.—Roll call; appointment of tellers; election of officers; opening of question box; "Cambria County Roads," E. W. Baumgardner address, W. J. Hill, President of the Bedford County Supervisors' Association; discussion, "The Best Way for a Township to Begin Making Permanent Roads," Edward Brawley and Nathaniel Blough; discussion.

PERSONALS

(Continued from page 386.)

Rockland, Frank C. Flint; Saco, James H. Fenderson; South Portland, Charles E. West; Waterville, Ora A. Meader.

Brown, Arthur, a pioneer architect and engineer of the Pacific Coast, died at Oakland, Calif., March 8, aged 86.

Carl Reeves, John L. Hall and Amos Slater have announced the formation of an engineering partnership and have opened offices in the Henry Building, Seattle, Washington.

Fisher, William J., has resigned as city engineer of Pontiac, Mich.

Van Valkenburgh, C. C., Jr., has been appointed city engineer of Fresno, Calif., succeeding B. E. Cronkite.

UNITED STATES CIVIL SERVICE EXAMINATION. Civil Engineer and Superintendent of Construction (Male).

March 21-22, 1917.

The United States Civil Service Commission announces an open competitive examination for civil engineer and superintendent of construction, for men only, on March 21 and 22, 1917. A vacancy in the Quartermaster Corps, Schofield Barracks, Hawaii, at \$1,500 a year. The duties of this position include supervision of the erection of Army post buildings (barracks, officers' quarters, storehouses, etc.), the laying out of grounds, construction of roads, sewers, etc., and, at seacoast posts, wharves.

Competitors will be examined in the following subjects, which will have the relative weights indicated:

Subjects.	Weights.
1. Mathematics (elementary problems in mensuration, solution of plane triangles, and theoretical and applied mechanics, involving a fair knowledge of pure mathematics up to and including elementary calculus)	15
2. Theory and practice of surveying and use and care of instruments (comprising transit, including stadia work, level, plane table, rods, chain, tape, etc., surveying, levelling, and other field work required in civil engineering)	25
3. Building construction, specifications, etc. (involving knowledge of all materials employed in first-class buildings and of details of construction and of specifications)	35
4. Training and experience	25
Total	100

The applicant must show that he has had at least five years' experience in architectural construction and its supervision on the ground and in civil engineering. Graduation in engineering or architecture from a recognized technical school will be equivalent to not more than four years of the five required.

Applicants should at once apply for Form 1312, stating the title of the examination desired, to the Civil Service Commission, Washington, D. C. The exact title of the examination as given at the head of this announcement should be stated in the application form.

ADVANCE CONTRACT NEWS

ADVANCE INFORMATION BIDS ASKED FOR

CONTRACTS AWARDED ITEMIZED PRICES

To be of value this matter must be printed in the number immediately following its receipt, which makes it impossible for us to verify it all. Our sources of information are believed to be reliable, but we cannot guarantee the correctness of all items. Parties in charge of proposed work are requested to send us information concerning it as early as possible; also correction of any errors discovered.

BIDS ASKED FOR

STATE	CITY	REC'D UNTIL	NATURE OF WORK	ADDRESS INQUIRIES TO
STREETS AND ROADS.				
Tenn.	Erwin	8 p.m., Mar. 16	19,000 sq. yds. pavement, sewers, etc.	H. W. Morgan, Town Engr.
O.	Marion	Mar. 16	20,000 sq. yds. substantial paving	E. S. Ault, City Engr.
O.	Springfield	noon, Mar. 16	Paving four streets	C. E. Ashburner, City Mgr.
O.	Cleveland	noon, Mar. 16	Paving subway and approaches	Bridge Engr.
N. C.	Rocky Mount	Mar. 16	16,000 sq. yds. asphalt or bitulithic and 7,000 ft. concrete curb and gutter	G. C. White, City Engr.
Pa.	New Castle	March 16	Grading and paving with concrete 6 miles	T. A. Gilkey, Engr., Mercantile Bldg., New Castle.
Pa.	Philadelphia	Mar. 16	Paving and repaving with asphalt, brick and granite, and wood block; furnishing motor truck, sprinkling roads, repairing bit. pavts. and constr. curb	Bur. of Hghwys., Dept. P. W.
Ill.	Decatur	10 a.m., Mar. 17	Opening, grading and draining street	Chas. Becker, Supt. of Sta.
Tenn.	Jackson	10 a.m., Mar. 17	3,100 sq. yds. brick pavement	Hu M. Harris, Comnr. of Sta.
Wash.	Tacoma	Mar. 17	3.66 miles bitucrete, Warrenite, asph. or asph. concr.	County Engineer.
Wis.	Racine	Mar. 17	30,000 sq. yds. brick, 4,000 sq. yds. sheet asphalt, 1,500 sq. yds. reinforced concrete; curbs and gutters	P. H. Connolly, City Engr.
O.	Cleveland	Mar. 17	County road work	E. G. Krause, Co. Clerk.
O.	Kent	Noon, Mar. 19	Improving several streets	E. S. Royer, Village Engr.
Ind.	Goshen	1:30 p.m., Mar. 19	Two brick and concrete roads	A. R. Bemenderfer, Town Aud.
Ind.	Kokomo	Mar. 19	Resurfacing with modern pavement	Ben Havens, City Clerk.
Wash.	Everett	Mar. 19	Constructing three roads	County Commissioners.
Pa.	Wilkes-Barre	2 p.m., Mar. 19	Curbing and paving Pittston Rd.	Engr. of Rds. & Bridges.
N. Y.	Albany	1 p.m., Mar. 19	Furnishing bituminous materials	E. Duffey, State Highway Comr.
Mich.	Marshall	March 19	5.76 miles concrete, bit. concrete or brick	County Clerk.
Ky.	Louisville	4 p.m., Mar. 19	400,000 gallons road oil	D. R. Lyman, Chief Engr.
Wash.	North Yakima	Mar. 19	Grading several miles; bridge superstructure	County Engineer.
Ind.	Indianapolis	10 a.m., Mar. 19	Grading and paving streets	B. J. T. Jeup, City Engr.
Minn.	St. Paul	10:30 a.m., Mar. 19	Repaving Minn. St.	H. W. Austin, Pur. Act.
Ill.	Rock Island	9 a.m., Mar. 19	Paving 6th Ave. with brick	Wm. McConochie, Mayor.
La.	Keokuk	6 p.m., Mar. 19	9,000 sq. yds. brick pavement and 11,280 ft. of curb	O. W. Sandberg, City Clerk
Minn.	St. Paul	10 a.m., Mar. 19	Macadamizing roads	G. J. Ries, Co. Aud.
Wis.	Manitowoc	4 p.m., Mar. 19	Furnishing one car load of road oil	J. J. Kelley, City Clerk.
La.	Cherokee	1:30 p.m., Mar. 20	11 miles permanent highway construction	W. O. Dailey, Co. Audr.
Ill.	Berwyn	8 p.m., Mar. 20	Asphaltic concrete pavement & concrete curb & gutter	City Clerk.
La.	Davenport	2 p.m., Mar. 20	Laying permanent sidewalks and crossings	J. W. Crowley, Comr. of P. W.
Cal.	Sioux City	Mar. 20	120,000 cu. yds. road grading	E. E. Hosmer, Co. Aud.
Cal.	Fresno	Mar. 20	5,000 to 8,000 bbls. road oil	W. H. Ryan, City Clerk
Fla.	Palatka	Mar. 20	6,000 sq. yds. brick pavement	S. C. Stallings, City Engr.
Tex.	Jacksonville	10 a.m., Mar. 20	25 miles gravel highways	L. H. Powell, Chief Engr.
Mass.	New Bedford	noon, Mar. 20	Non-asphaltic road oil for 1917	W. P. Hammersley, Supt. Sta.
N. Y.	Albany	1 p.m., Mar. 20	Furnishing bituminous materials	E. Duffey, State Highway Comr.
Minn.	Tracy	8 p.m., Mar. 20	Paving eight blocks	Lester Fitch, City Clerk.
N. J.	Maplewood	8 p.m., Mar. 20	3,000 tons broken stone and 60,000 gals. road oil	Edward Arcularius, Twp. Clk.
Ky.	Olive Hill	Mar. 20	Street work, \$40,000 available	City Commissioners.
O.	Canton	Mar. 20	Constructing several miles brick and macadam	County Surveyor.
N. Y.	Binghamton	3 p.m., Mar. 21	Paving several streets	W. Earl Weller, City Engr.
Wash.	Edmonds	6 p.m., Mar. 21	Grading and paving with concrete	J. T. McElroy, City Clk.
N. J.	Newark	2:30 p.m., Mar. 21	Grading at county hospital	Co. Engr.
O.	Cleveland	Mar. 21	Paving bridge; cost, \$145,000	W. A. Stinchcomb, Co. Surv.
N. Y.	Brooklyn	11 a.m., Mar. 21	Paving with asphalt and granite blocks and furnishing 5 asphalt trucks	Bur. of Hghwys., 50 Court St.
O.	Cleveland	noon, Mar. 21	Paving 12 streets	Comnr. of Engrg.
Mich.	Flint	10 a.m., Mar. 21	Constructing 4 miles of gravel road	County Road Comrs.
Ind.	Indianapolis	10 a.m., Mar. 21	Resurfacing Washington St.	B. J. T. Jeup, City Engr.
Minn.	Warren	1:30 p.m., Mar. 21	Dragging state roads during 1917	Oswald Lind, Highway Engr.
Pa.	Ebensburg	1 p.m., Mar. 22	Reconstr. 10,000 ft. with brick pavt.; furn. 660,000 paving bricks	O. P. Thomas, Engr., J'hnst'n.
Ind.	Lawrenceburg	noon, Mar. 22	Constructing county roads	H. E. Lutherbeck, Co. Aud.
Va.	Roanoke	Mar. 22	Macadamizing, granolithic sidew'ks, concr. curb and gut.	F. L. Gibboney, City Engr.
Kan.	Independence	2 p.m., Mar. 22	Constructing cement sidewalks	City Engr.
Ky.	Jamestown	Mar. 23	County road work	Fiscal Court, Russell Co.
O.	Cincinnati	noon, Mar. 23	Paving with asphalt or durax and setting granite curbs	Chief Engr., Dept. of P. Ser.
Wis.	Racine	10 a.m., Mar. 24	Paving several streets	P. H. Connolly, Pres. Board of Public Works.
Fla.	Jacksonville	Mar. 24	125,000 vitrified paving blocks	Board of Port Comrs.
Ind.	Greencastle	11 a.m., Mar. 24	Constructing 11 miles gravel and macadam road	J. M. Allen, Co. Aud.
Ky.	Hyden	Mar. 24	Paving and improving streets	City Clerk.
Ky.	Wayland	Mar. 24	Improving several streets, cost \$30,000	City Clerk.
Cal.	Los Angeles	10 a.m., Mar. 26	Constr. asph., stone, and brick and bit. pavts., and concr. and granite curbs, gutters, and sidewalks	H. B. Ferris, Sec. B. of P. Wks.
Ind.	Kokomo	Mar. 26	Improving roadway and constr. curbs, walks and gut'rs.	Ben Havens, City Clerk.
Cal.	Los Angeles	10 a.m., March 26	Street tunnel 1,602 ft. long and 28 ft. high, cost \$700,000	Board of Public Works.
Wash.	Everett	Mar. 26	Constructing trestle; cost, \$10,000	W. C. Bickford, Co. Engr.
Fla.	Panama City	2 p.m., Mar. 26	16 miles paved road, 39 miles sand-clay-gravel road, and 140 miles clearing and grading; bridges	Gordon Sumner, Co. Engr.
Wis.	Plymouth	Mar. 26	15,500 sq. yds. brick, concr. or macadam pav. and curbs	City Clerk.
N. D.	Bismarck	8 p.m., Mar. 26	Grading Washington Ave.	R. H. Thistlethwaite, City Auditor.
Md.	Easton	Mar. 27	4 miles macadam or concrete road	G. P. Prox, Co. Engr.
Tex.	Terrell	Mar. 27	12,587 sq. yds. bit. macadam and reinforced concr.	H. Brewster, City Engr.
Ariz.	Nogales	Mar. 27	Road construction, cost \$35,000	Hd. County Supervisors
N. J.	Nutley	8 p.m., Mar. 27	Sidewalks, curbs and gutters	E. N. Smith, Town Engr.
O.	Lorain	noon, Mar. 28	32,000 sq. yds. pavement	C. M. Osborn, City Engr.
N. J.	Baleville	2 p.m., Mar. 29	10,320 sq. yds. gravel pavement	H. D. Robbins, 613 American Mech. Bldg., Trenton

BIDS ASKED FOR

STATE	CITY	RECD UNTIL	NATURE OF WORK	ADDRESS INQUIRIES TO
N. J.	Newark	Mar. 29	Paving several streets with concrete	M. R. Sherrerd, Chief Engr.
N. J.	Elizabeth	2 p.m., Mar. 29	20,000 cu. yds. of earth fill	T. E. Collins, City Engr.
W. Va.	Pennsboro	Mar. 29	Eight miles 9-ft. concrete road	H. H. Wilson, Mgr., Winston & Co.
Ill.	Canton	Mar. 30	Road work, \$20,000 available	E. F. Motsinger, Co. Highway Supt.
Ill.	Naperville	Mar. 30	Concrete paving, \$105,000 available	C. A. Ashley, City Engr.
Wis.	Richland Center	Mar. 30	Paving and resurfacing streets	Commr. of Pub. Wks.
Ill.	Virginia	April 1	Road improvement; cost, \$14,000	Co. Clerk
N. Y.	East Rochester	April 2	8,730 sq. yds. bituminous or concrete pavement	M. Domras, Village Clerk.
W. Va.	Fayetteville	April 2	Constructing county road	T. F. Maloy, Road Engr.
Ind.	Versailles	April 2	Constructing macadam road	J. F. Lochard, Co. Aud.
Ind.	Rockport	2 p.m., Apr. 2	Constructing county road	J. Frank Stocking, Co. Aud.
Ind.	Kentland	2 p.m., Apr. 2	Constructing macadam road	S. R. Sizelove, Co. Aud.
Ind.	Rushville	2 p.m., Apr. 2	10,672 ft. gravel road	W. J. McMillin, Co. Aud.
Ind.	New Albany	10 a.m., Apr. 2	Constructing 6,090 ft. of road	Emile Dapaquier, Co. Aud.
Ind.	Knox	noon, Apr. 3	Constructing township road	Chas. Weninger, Co. Aud.
Ind.	Wabash	10 a.m., Apr. 3	Constructing county road	F. P. Kircher, Co. Aud.
Ind.	Plymouth	1:30 p.m., Apr. 3	Constructing 6 gravel roads	O. H. Weber, Co. Aud.
Ind.	Salem	April 3	Constructing 3 county roads	Ell Batt, Co. Aud.
Ind.	Albion	2 p.m., Apr. 3	Constructing 4 brick roads	G. A. Young, Co. Aud.
Ind.	Corydon	2 p.m., Apr. 3	Constructing 2 stone roads	Sam C. Mauck, Co. Aud.
Ind.	Logansport	10 a.m., Apr. 3	Constructing county roads	A. P. Flynn, Co. Aud.
N. J.	Orange	4 p.m., Apr. 3	25,000 sq. yds. wood block repaving	E. T. Crane, City Engr.
Ky.	Madisonville	April 3	Two miles macadam road	County Clerk
Ind.	Kokomo	10 a.m., Apr. 3	4,000 feet of gravel road	W. L. Benson, Co. Aud.
Ind.	Bloomfield	2 p.m., Apr. 3	Constructing macadam roads	G. E. Kidd, Co. Aud.
Ind.	Columbus	10 a.m., Apr. 4	Constructing county road	W. H. Scott, Co. Aud.
Ind.	Plymouth	2 p.m., Apr. 4	Constructing gravel road	O. H. Weber, County Aud.
N. J.	Bayonne	April 15	50,000 sq. yds. asph. and 3,800 sq. yds. granite block	W. L. Clarkson, City Engr.
Vt.	Newport	noon, Apr. 16	9,500 sq. yds. concr. pavt., 4,000 ft. concr. curb and 3,500 sq. yds. concr. sidewalk	J. O. Goodrich, Supt. Sta.

SEWERAGE.

Tenn.	Erwin	8 p.m., Mar. 16	Constructing storm sewers	H. W. Morgan, Town Engr.
O.	Cleveland	noon, Mar. 16	Sewer in subway	Bridge Engr.
N. J.	Island Heights	Mar. 16	Constructing sewer extension and disposal plant	L. A. Croxton, Boro Engr., Mt. Ephraim N. J.
Pa.	Williamsport	10 a.m., Mar. 16	Constructing many sewers	G. K. Harris, Supt. of Sta.
Neb.	Havelock	8 p.m., Mar. 16	Sewer construction; cost, \$1,400	A. J. Blount, City Clerk.
Wis.	Oshkosh	2 p.m., Mar. 16	Sewers in three streets	Board of Public Works.
N. Y.	Albany	noon, Mar. 16	Drain over state barge canal at Brockport; cost \$6,175	F. M. Williams, State Engr.
Ill.	Decatur	10 a.m., Mar. 17	24-in. vitrified sewers	Chas. Becker, Supt. of Sta.
N. J.	Westfield	Mar. 19	2,750 ft. 18-in. sanitary sewer	Carl Clark, Town Clerk
Minn.	St. Paul	10:30 a.m., Mar. 19	Constructing and extending sewers	H. W. Austin, Pur. Agt.
Wis.	Beaver Dam	7:30 p.m., Mar. 19	10,245 ft. of sewers	Board of Public Works.
Minn.	Benson	10 a.m., Mar. 19	Tile drainage ditch; cost, \$65,832	D. P. Carney, Co. Aud.
Minn.	Benson	2 p.m., Mar. 19	Constructing tile drains; cost, \$1,603	D. P. Carney, Co. Aud.
Pa.	Coatesville	Mar. 19	4,500 ft. 2-in. pipe for sewers	J. W. Harry, City Engr.
N. J.	Camden	8 p.m., March 19	Constructing 10 blocks of sewer	City Engr.
La.	Webster City	1:30 p.m., Mar. 19	78,000 feet tile drains	R. G. Austin, Engr.
Ind.	Goshen	Mar. 19	5,710 feet 10 to 15-in. sewers	J. W. Haverley, Engr.
Pa.	Johnstown	Mar. 20	Constructing several sewers	C. P. Collins, Sanitary Engr.
S. D.	Sioux Falls	Mar. 20	Constructing 15 blocks of sewers	County Clerk.
Minn.	Ortonville	3 p.m., Mar. 20	25,000 feet tile drains; cost, \$8,267	A. V. Randall, Co. Aud.
Cal.	Brawley	Mar. 21	4,700 ft. 15-in. sewer	G. R. Wade, City Engr.
Ark.	Eudora	Mar. 21	Constructing water works and sewer system, pumping plant, steel tower and tank and reservoirs	X. A. Kramer, Engr., Magnolia, Miss.
O.	Cleveland	noon, Mar. 22	Sewers in 8 streets	Commr. of Engrs.
N. J.	Newark	3:30 p.m., Mar. 22	6,380 ft. 6 to 54-in. sewers, etc.	M. R. Sherrerd, Chief Engr.
Pa.	Philadelphia	noon, Mar. 22	Constructing sewers and bridges	G. E. Batesman, Dir. Bur. of Surveys.
Ala.	Tuskegee	noon, Mar. 22	Sewerage system and Imhoff disposal plant at Normal and Industrial School	W. G. Franz, Union Trust Bldg., Cincinnati, O.
Minn.	W. Mnpls.	7:30 p.m., Mar. 22	Sanitary sewer system	J. F. Druar, Engr., Comm'r'l Bldg., St. Paul.
Ala.	Dadeville	Mar. 23	Constructing sanitary sewerage system	J. B. Jenkins, Mayor.
N. J.	Garfield	8 p.m., Mar. 23	Constructing sanitary sewers; furn. 25 tons c. i. pipe	A. L. Petterson, Engr., Pas'd.
La.	Newton	7:30 p.m., Mar. 23	27,540 feet of sewers and disposal plant; plans \$8	M. G. Hall, Centerville.
O.	Ashtabula	noon, Mar. 24	Constructing storm sewer	City Engineer.
Ind.	Greenfield	Mar. 24	6,000 ft. 8 to 15-in. tile drains	County Surveyor
Kan.	Neodesha	Mar. 26	Imhoff disposal plant with sprinkling filters	City Clerk.
D. C.	Washington	Mar. 26	Concr. cesspool and pump chamber; 2 motor centrifugal pumps, pipe, valves and fittings	Bureau of Yards & Docks, Navy Dept.
Cal.	Los Angeles	10 a.m., Mar. 26	Constructing storm and sanitary sewers	H. B. Ferris, Sec. B. of P. Wks.
La.	Wilton Junction	4 p.m., Mar. 26	Sewerage system and disposal plant	D. G. Fisher & Co., Engrs., Davenport.
Minn.	Sartell	1 p.m., Mar. 26	2,146 feet 18-inch sewer	C. H. West, Engr., St. Cloud.
La.	Hampton	Mar. 27	26,000 feet tile drain; cost \$28,000	Geo. Mack, Engr.
La.	Dyersville	8 p.m., Mar. 27	1,500 feet 8-inch sewer, manholes, etc.	W. C. Loosbroch, Town Clk.
N. Y.	Binghamton	2 p.m., Mar. 28	3,000 feet 8 to 24-inch vitrified sewers	W. Earl Weller, City Engr.
O.	Canton	Mar. 28	Sewer and pavement constr.; cost, \$215,000	City Engr. Sarver.
Wis.	Ripon	Mar. 30	Alteration to sewage disposal plant	C. W. Stuart, City Clerk
Ill.	Hillsboro	April 1	Constructing sewer system; cost, \$12,000	W. A. P. Warren, City Engr.
N. Y.	East Rochester	April 1	3,300 lin. ft. storm sewer	M. Domras, Village Clerk.
La.	Keokuk	April 2	3,300 ft. 8 to 60-in. vit. and concrete sewer	J. Winters, City Engr.
Mont.	Big Sandy	8 p.m., Apr. 2	Constructing sanitary sewers	Miracle Engrg. Co., Gt. Falls.
S. D.	Clear Lake	3 p.m., Apr. 3	4½ miles sewers and disposal plant	Dakota Engrg. Co., Mitchell.
S. D.	Wessington Springs	7:30 p.m., Apr. 11	6 miles sewers and disposal plant	Dakota Engrg. Co., Mitchell.
S. D.	Woonsocket	1 p.m., Apr. 12	12.4 miles tile drains	Dakota Engrg. Co., Mitchell.
O.	Cleveland Heights	May 3	Constructing tile sewers	F. A. Pense Engr'g. Co., Marshall Bldg., Cleveland.
India.	Calcutta	2 p.m., June 1	Storm water pumping plant	C. C. Chatterjee, Sec. Corp. of Calcutta.

WATER SUPPLY.

Mich.	Dowagiac	7 p.m., Mar. 16	Drilling two 10-in. wells 100 ft. deep	W. E. Reynolds, City Engr.
Minn.	Duluth	11 a.m., Mar. 16	Laying gas and water mains	W. H. Borgen, City Clerk.
Neb.	Albion	4 a.m., Mar. 16	300-gals.-per-minute pumping unit complete	G. R. Pittinger, Mayor.
O.	Deshler	noon, Mar. 20	Deep well pump, 2 centrifugal pumps, concr. reservoir, elevated tank and distribution system	Geo. Chaspe, Engr., Nasby Bldg., Toledo.
Tenn.	Johnson City	7 p.m., Mar. 20	Furn. water meters: one hundred ¾-in., two ½-in., two 1-in., two 2-in.	P. F. McDonald, Cmr. & Engr.
Wyoming.	Sheridan	10 a.m., Mar. 20	14 fire hydrants, 23 4 and 6-in. valves and 25 valve boxes	T. A. Morris, City Clerk

BIDS ASKED FOR

STATE	CITY	REC'D UNTIL	NATURE OF WORK	ADDRESS INQUIRIES TO
N. Y.	Geneva	.....2 p.m., Mar. 20.	Constructing slow sand filter units and remodeling regulating house	Board of Public Works
Ia.	Davenport	.....2 p.m., Mar. 20.	Water and sewer services	J. W. Crowley, Comr. P. Wks.
Cal.	Brawley	.....Mar. 21.	Concrete reservoir	G. R. Wade, City Engr.
Kan.	Lawrence	.....10 a.m., Mar. 21.	Water main extensions, pumping plant and filtering and softening equipment	Black & Veatch, Interstate Bldg., Kansas City, Mo.
N. Y.	New York	.....2 p.m., Mar. 21.	Furn. and laying water mains and appurtenances	Corporation Counsel, Room 2351, Municipal Bldg.
N. Y.	Canton	.....4 p.m., Mar. 22.	Furnishing 2,250 tons c. i. pipe and laying mains	Board of Water Comrs.
N. J.	Garfield	.....8 p.m., Mar. 23.	25 tons 6-in. c. i. pipe	J. A. Dwyer, Boro. Clerk.
Conn.	Norwalk	.....2 p.m., Mar. 24.	Additions to filtration plant	Comrs. of 2d Tax. Dist.
Mich.	Ann Arbor	.....noon, Mar. 26.	Laying 22,000 ft. 12 and 16-in. c. i. pipe	G. S. Williams, Engr., Cornwall Bldg., Ann Arbor.
Minn.	Plainview	.....7.30 p.m., Mar. 26.	140-gallon deep well pump	J. F. Druar, Engr., Commercial Bldg., St. Paul.
Ky.	Murray	.....Mar. 29.	Oil engines, pumps, well equipment and power house	X. A. Kramer, Engr., Magnolia, Miss.
Ill.	Gibson City	.....April 1.	Constructing water and light plant	City Clerk.
Mont.	Big Sandy	.....8 p.m., Apr. 2.	Laying water mains, valves and hydrants	Miracle Engrg. Co., Gt. Falls.
MISCELLANEOUS.				
Minn.	Faribault	.....Mar. 16.	Constructing drainage ditch	S. G. Goff, Jr., Clk. of Court.
N. J.	Longport	.....Mar. 17.	Constructing sea wall, cost \$275,000	J. R. D. Bray, Vil. Recorder.
Minn.	Duluth	.....11 a.m., Mar. 17.	2-ton motor truck	W. H. Borgen, City Clerk.
Tenn.	Memphis	.....Mar. 19.	25,000 tons rip-rap stone	U. S. Engineer Office, Custom House.
O.	Akron	.....noon, Mar. 20.	Two motor flushers, 2 motor tractors and 10 trailers	C. F. Beck, Service Director.
Minn.	Duluth	.....11 a.m., Mar. 20.	Sprinkling and cleaning streets during 1917	W. H. Borgen, City Clerk.
Ont.	London	.....Mar. 22.	Ten-ton steam roller	John Stuart, County Clerk.
Ia.	Mason City	.....Mar. 26.	83,000 ft. 6 to 40-in. tile drains	H. D. Keirl, Engr., Clear Lake
Ga.	Savannah	.....noon, Mar. 26.	1½ to 2-ton motor truck	G. R. Butler, Clerk.
Pa.	Sharpsburg	.....5 p.m., Mar. 26.	Collection and disposal of garbage	T. J. McGivern, Boro. Clerk.
Kans.	Leavenworth	.....Mar. 26.	3,000 bbls. portland cement at penitentiary	Supt. of Prisons, Dept. of Justice, Wash., D. C.
N. D.	Minot	.....8 p.m., Mar. 26.	Furnishing horse-drawn street flusher	A. D. Hagenstein, City Audr.
Ind.	Columbia City	.....Mar. 28.	Constructing drainage ditches	H. G. Bollinger, Comr. of Construction.
Ont.	Toronto	.....noon, Mar. 28.	Furnishing Synchronous condensers	Pur. Agt., 15 Wilton Ave.
Ind.	Columbia City	.....Mar. 29.	Constructing tile drains; about 50 miles	H. G. Bollinger, Comr. of Construction.
Ind.	Columbia City	.....Mar. 30.	Furnishing 50 miles of tile	H. G. Bollinger, Comr. of Construction.
Mich.	Detroit	.....Apr. 16.	Furnishing and placing stone riprap at Harbor Beach	U. S. Engr. Office

STREETS AND ROADS.

Flagstaff, Ariz.—City making plans paving 26 blocks.

Fort Smith, Ark.—City commissioner will call a bond election March 21, for the purpose of disposing of the bonds of Paving District No. 12. Cost, including paving, interest and overhead expenses, is estimated at \$15,200, but it is the intention to offer only about \$12,500 of the bonds.

Tucson, Ariz.—The construction of the proposed Mt. Lemmon Rd. from Tucson to Soldiers' Camp in the Santa Catalina Mountains will be taken up immediately upon receipt from the United States Forest Service of a report as to the standard to which the road must conform, was the assurance given by the members of the Pima County Board of Supervs.

San Diego, Cal.—Common Council adopted resolution for paving 4th St. with one-course of Portland cement.

Taft, Cal.—For paving various streets, bitulithic, concrete and macadam, E. M. Lynch, Glendale, making plans, about \$85,000.

East Hartford, Conn.—Dist. Engineer C. Henry Olmsted presented to the Bd. of Comrs. of the East Hartford Fire District the plaster casts of the proposed improvements on Main St. The casts are colored to show the street as it would look under the two plans.

Westerly, Conn.—Town appropriated \$179,000 to meet the expenses for the year, \$51,800 for the improvement and repairs to highways and bridges under the supervision of the new highway commission.

Auburndale, Fla.—Board of commissioners of Polk county granted a petition from the residents of the district and the northern part of Polk county authorizing the creation of a road and bridge district and the calling of an election to authorize the issuance of \$150,000 of bonds for the purpose of building a road from Auburndale to the Lake county line, where it will connect with the Leesburg-Bartown road of the good roads system of that county at the bridge across the Withlacoochee River and from what is known as the Lake county air line. To be built of modified sheet asphalt, 9 ft. wide, with beams of clay 3 ft. wide, and conform to the specifications of the present Polk

county road system that is being built at a cost of \$1,500,000. Total amount that will be authorized by Polk county for the building of modern asphalt roads will be \$1,975,000, practically \$2,000,000.

Tampa, Fla.—Clerk County Comrs. W. P. Culbreath will receive bids Mar. 20. Wimauma Special Road and Bridge district bonds of \$30,000.

Fort Myers, Fla.—Bids received Mar. 12 Caloosa Valley Highway special road and bridge district bonds to amount of \$190,000. Clk. Bd. of Co. Comrs. J. T. Garner.

Alma, Ga.—An election will be held June 14 to vote on issuing \$60,000 road bonds.

Athens, Ga.—City contemplates issuing \$135,000 street improvement assessment bonds.

Macon, Ga.—The county commissioners will go before the road board March 31 and seek co-operation in paving the Bibb roads. Plan to pave one mile from the city limits on the Forsyth road, the Houston road, the Columbia road, the Cross Keys road and the Clinton road should the county vote the proposed \$1,000,000 bond issue. A great deal of paving will be done this summer.

Coeur d'Alene, Ida.—The board of county commissioners has not as yet passed upon the proposed \$200,000 bond issue for good roads, agitated by the chamber of commerce. No election has been called and it is regarded as doubtful whether such an issue would be passed if it was placed on the ballot. E. Elder is clerk of the board of county commissioners.

Moline, Ill.—Bd. of Local Imprvts. approved the paving of 25th St. district. This provides for the improvement of 25th St. from 15th to 23rd Aves., and several of the intersecting avenues; and paving of 8th and 9th Aves. from 28th to 29th Sts. Rejected the improvement to pave the alley between 6th and 7th Aves. and 12th and 13th Sts. because of objections offered by property owners. All projects call for brick material.

Monmouth, Ill.—To build hard surface roads, Warren county plans an election to vote \$750,000 bonds.

Oakwood, Ill.—Oakwood township plans \$60,000 bonds for the purpose of constructing a little over 3 miles of paving.

Oregon, Ill.—In the near future an election will be held to issue \$500,000 road bonds.

Pekin, Ill.—Bd. of Local Improvements contemplates improvements to include many streets on northeast side 8th from Bway to Willow and extension of pavements on other streets.

Peoria, Ill.—The extension of the Galena road through the village of Peoria Heights is being planned by the members of the Galena Road Permanent Improvement Association which disbanded with the understanding that a similar organization is to be formed early in the spring. Reports submitted showed that the sum of \$29,236.17 was expended on the brick pavement.

Springfield, Ill.—An ordinance providing for the paving of Hought St. from Fifth to Sixth Sts. with brick, passed.

Springfield, Ill.—The Illinois Highway Improvement Association and other good roads representatives will meet here Mar. 13 to consider the Danville platform of the association calling for a state bond issue of \$60,000,000 for hard road system.

Bloomfield, Ind.—Bids received Mar. 15, 1917, at 2 p. m., by Treasurer of Greene County, for sale, \$4,500 and \$7,250 highway improvement bonds, 4½ per cent, ten years. Levi J. Bauer, Treas.

Brazil, Ind.—Bids received March 23, 1917, at 10:30 a. m., by Treasurer of Clay county, for sale \$3,200 and \$9,600 highway improvement bonds, 4½ per cent, ten years. Thomas W. Swinehart, treasurer.

Brookville, Ind.—Bids received March 20, 1917, at 1 p. m., by Treasurer of Franklin county, for sale, \$7,483 highway improvement bonds, 4½ per cent, ten years. Chas. E. Winscott, treasurer.

Decatur, Ind.—The county commissioners announced the sale of a road April 4, at 10 o'clock at Decatur. Highway is the Miller road and is on the boundary line of Monroe township, Allen county, and of Union township, Adams county, 5,312 feet long. The specifications call for a double track system 24 feet wide, way, the macadam to be 10 feet deep. The stone is to be 10 inches deep in the center and eight inches at the sides, the top of which is to be screenings three inches deep. The engineer's estimate of cost for the construction of the road is \$4,382.50.

Fort Wayne, Ind.—Petitioners have asked the County Comrs. that the Lin-

coln Highway in Monroe Twp., a mile east of Townley to the state line, be widened to 40 ft.

Frankfort, Ind.—Bids received March 20, 1917, at 2 p. m., by Treasurer of Clinton county, for sale \$2,160, \$6,560 and \$4,440 highway improvement bonds, 4½ per cent., ten years. Oliver M. Rousch, treasurer.

Goshen, Ind.—Elkhart county commissioners were unable to award contracts for the four roads advertised March 6 because of injunctions filed against same.

Indianapolis, Ind.—Ordinance's introduced for improvements: 40th St. from College to Winthrop; Emerson from St. Clair to 10th, curb; Emerson from St. Clair to 10th, grade and gravel; Newman from 12th to Brookside, cement walks; Newman from 12th to Massachusetts Ave., permanent improvement.

Irrington, Ind.—No bids were submitted to Marion county commissioners at their meeting of March 6, for construction of a gravel road in Center township.

Jasper, Ind.—Dubois county commissioners failed to award contract for the Patoka township road advertised for letting at their March session.

Jeffersonville, Ind.—Clark county commissioners failed to award the contract for improvement of Fulton landing hill advertised for letting at their meeting of March 5.

Knox, Ind.—Starke county commissioners failed to award contract for the Oregon township road advertised for letting on March 6.

Liberty, Ind.—Bids received March 20, 1917, at 2 p. m., by Treasurer of Union county, for sale, \$7,483 highway improvement bonds, 4½ per cent., ten years. Wm. N. McMahan, treasurer.

Mt. Vernon, Ind.—Geo. J. Ehrhardt, treasurer Posey county, sold a \$4,500 issue highway bonds to the Mt. Vernon National Bank, Mt. Vernon, Ind., for a premium of \$123.

Monticello, Ind.—White County highway bonds, \$2,000, 4½ per cent, 10 years, were sold to B. A. Dickson, of Monon, Ind., at par, accrued interest and \$20 premium.

Plymouth, Ind.—Bids received Apr. 3, 1917, at 2 p. m., by Treasurer of Marshall County, for sale, \$8,900 and \$9,100 highway improvement bonds, 4½ per cent, 10 years. George W. Huff, Treas.

Shoals, Ind.—Martin county failed to award contract for the Mitchellree township road at the March meeting of the board of commissioners.

Spencer, Ind.—Owen County highway bonds to the amount of \$14,244.80 were sold to the Spencer National Bank, of Spencer, Ind., for \$275 premium.

Terre Haute, Ind.—The bid of the Breed, Elliott & Harrison firm, of Indianapolis, for the \$40,000 worth of bonds issued on the city of Terre Haute was accepted by the City Controller at premium of \$1,005. Other bids: J. F. Wild & Co., \$950; the R. L. Day Co., of Boston, Mass., \$272; the Fletcher American Natl. Bank, of Indianapolis, \$213, and the Hanchett Bond Co., of Chicago, offering a premium of \$277.50.

Wabash, Ind.—Wabash county commissioners failed to award the contract for the Howell road advertised for letting on March 6.

Cedar Falls, Ia.—City council ordered the construction of 25½ blocks of pavement and authorized the mayor and city clerk to advertise for bids. Comprises re-paving of downtown Main street and the paving of a number of cross streets in the residence section. Sheet asphalt and asphaltic concrete will be considered.

Council Bluffs, Ia.—The council directed the city engineer to prepare a plan of the proposed Canning St. paving project to cover pavement up to the "forks" of the road.

Davenport, Ia.—Commissioner John W. Crowley announced city will expend a quarter of a million dollars during 1917 for paving and repair work and would be resumed by April 2, when unfinished 1916 contracted work, estimated at \$72,000, would be started on the way to completion.

Glenwood, Ia.—City council has ordered preliminary estimates, plans and specifications for about 35,000 yards of paving and 30,000 lineal feet of curb or combined curb and gutter. Theo. S. DeLay, Consulting Engineer.

Keokuk, Ia.—Council is planning to order three more blocks of cement paving.

Hutchinson, Kan.—Petition for the paving of 11th east with brick on a concrete base was presented to city commission.

Lawrence, Kans.—City Commission accepted the plat of the Edgemoor road district in the Thacher addition and established the grade of the road as recommended by the city engineer. An ordinance will be drawn soon providing for the opening of the road and the establishment of the grades.

Greenup, Ky.—The Tillotson & Wolcott Co., of Cleveland, successful bidder for road and bridge bonds to amount of \$40,000. A. J. Cochran, clerk county court.

Hyden, Ky.—Bids for improving streets to cost about \$40,000 will be received until Mar. 24 by the Mayor.

Jamestown, Ky.—Fiscal Court will receive bids until Mar. 23 for road work.

Olive Hill, Ky.—City Comrs. will receive bids until Mar. 20 for street improvements. Cost, about \$40,000.

Wayland, Ky.—Town Clk. will receive bids until Mar. 24 for improving streets at a cost of about \$30,000.

Gibbsland, La.—Citizens recently authorized issuance of \$65,000 bonds for proposed road work. Address Pres. Police Jury, Arcadia.

Marksville, La.—An election will be held March 27 to issue \$120,000 Road District No. 16 bonds.

Pleasant Hill, La.—Bids received Mar. 17 for road District No. 6 bonds \$30,000. Secretary, Board District Supervisors, W. R. Ross, care Bank of Pleasant Hill.

St. Charles, La.—City plans paving 2d and 5th Aves.

Huntington, L. I.—Petition, signed by business men of the town, was presented to the town board, asking for the submission before the voters at the coming election of a proposition for the appropriation of \$15,000 for the purpose of constructing concrete sidewalks, the sum to be apportioned among the villages of the township, outside of the incorporated village of Northport.

Jamaica, L. I.—The Progress Society of Far Rockaway has passed a resolution calling upon the Bd. of Estimate to appropriate money for the improvement of the Rockaway Blvd. from Jamaica to Far Rockaway. Land needed to make the highway wider has already been acquired along the entire route, and as the section of the road which runs through Nassau County is to be built by the State, the work is held up only by the need of \$350,000 to pay for the section from the westerly boundary of Nassau to Jamaica. The State is to construct its portion of the road at an estimated cost of \$130,000.

Patchogue, L. I.—A proposition to raise \$50,000 for the placing of permanent roads on East and West Main Sts., within the village limits, Railroad Ave., from West Main St. to the railroad tracks, and North Ocean Ave. from Main St. to Lake St., will be submitted to the voters at the annual village election, to be held on Mar. 20. The money is proposed to be raised by bond issue, \$4,000 of which is to be repaid in 1921, and the same amount each succeeding year, if the voters favor the proposition.

Hagerstown, Md.—Breathedsville district citizens will request Board of Co. Comrs. to build road from Lappans through Breathedsville to Mill Point.

Beverly, Mass.—Orders offered which were referred to the committee on public service and aid, providing for repairs and curbing on Myrtle St., and for luminous arc lights on Elliott St.

Beverly, Mass.—Orders introduced providing for a sidewalk on the easterly side of Sohler road at an estimated cost of \$1,500, for the installation of curbing on West Dane St. \$1,500 for curbing on Front St., \$220.

Fitchburg, Mass.—City council voted to have a decree prepared for the extension of Broad St. from river to Rollstone St., so the proposed new approach to Crocker Field by way of Circle St. could be established and so the architects could make plans to conform to the proposed new public approach from River St.

Leominster, Mass.—Supt. Jas. H. Johnston is considering the purchase of a light, two-ton motor truck, and an automatic dump-cart loader for the Highway Dept.

Lowell, Mass.—Comnr. Morse is preparing a list of streets to be macadamized this year with a view of making up the macadam loan order.

Methuen, Mass.—The question of issuing \$50,000 street improvement bonds will be considered by Selectmen March 17.

Wenham, Mass.—Town appropriated \$800 to build a permanent sidewalk in front of town hall.

Bessemer, Mich.—For about \$17,484, city plans paving Sophie St.

Ganges, Mich.—For improving highways, town plans \$50,000 bond issue.

Zeeland, Mich.—City Clerk D. Booustra will receive sealed bids March 19, paving bonds to the amount of \$17,000.

Duluth, Minn.—County board authorized appropriations: First district—\$700 for dragging, \$1,400 construction, \$1,300 expenses. Second district—\$8,000 for construction, \$9,900 materials. Improvement of state highways are included. Third district—\$1,000 for dragging, \$4,700 construction, \$2,200 miscellaneous expenses. Includes improvement of State Highway, No. 1. Fifth district—\$6,700 for dragging, \$18,000 construction, \$14,000 general expenses and materials. Includes improvement of State Highways, Nos. 1 and 2.

Ely, Minn.—Commercial Club discussed and strongly favored the construction of a highway southeast from this city, through the Stony country connecting with the Isabella-Finland Rd., coming out on the Duluth-Grand Marais Rd. at Finland, on the D. & N. M.

Red Wing, Minn.—The City Council passed a resolution ordering Main St., between Broad and Hill Sts., paved, preferably with strips of concrete along each side of the roadway, leaving the center clear.

Vicksburg, Minn.—Bids will soon be advertised by the comrs. for a contract to lay concrete sidewalks on Drummond St. from Bowmar Ave., where the paving stops, to Polk St.

Virginia, Minn.—Council to pave 21 blocks next summer. It is planned to improve portions of 10th, 11th and 12th Sts. south, Fifth, Seventh, Eighth and Ninth Aves. west.

Brandon, Miss.—The question of issuing \$75,000 Pelahatchie road district bonds carried.

Columbus, Miss.—In the near future the question of issuing \$25,000 Artesia Road District bonds will be submitted to the voters.

Chillicothe, Mo.—City to pave with brick with an asphalt filler, Locust St. from the north line of Webster St. to the north line of Jackson St., from property line to property line.

Chillicothe, Mo.—City to pave Wise St. Tarvia on a 6-in. macadam base.

Joplin, Mo.—Petitions are being circulated to pave Wall St. from 10th to 20th; the same thoroughfare from 20th to 23d, and 21st St. from Main St. west to Maiden Lane. J. B. Hodgdon, Comnr. of Streets.

Joplin, Mo.—Petition to pave 2nd St., from Byers Ave. to the alley west of Gray Ave. with concrete probably will be placed in circulation. J. B. Hodgdon, commissioner of streets and public improvements.

Great Falls, Mont.—Petitions received asking for special improvement district for laying concrete pavement in 2nd alley north from 13th to 14th Sts., and for laying a water main in 1st Ave. north to serve Blocks 387 and 348.

Alamogordo, N. M.—Otero county plans \$300,000 bond issue to build roads.

Carlsbad, N. M.—Election Mar. 17 in Eddy county to vote on \$100,000 bonds to build roads.

Kearney, Neb.—Paving bonds issue of \$50,000 will be submitted to the voters April 3.

Carson City, Nev.—Authority for the Comrs. of Washoe County to issue \$15,000 in bonds to be used in road construction, is asked in a measure introduced in the House. A portion of the money is to be used in building a county road from Verdi to Calavada and connecting with the California automobile road.

Collingswood, N. J.—Borough council approved and accepted the committee's report of citizens appointed by Mayor Jack, recommending granite block surface on a concrete foundation for the paving of Haddon Ave. and all other streets be macadamized.

Jersey City, N. J.—A resolution was adopted by the Hudson Boulevard Commission providing for the preparation of plans and specifications for the improvement of about five miles of Hudson Blvd. Specifications will call for bituminous concrete to be laid under a five-year guarantee. Plans will be considered by the commission April 4. Sections are between the Hackensack Plank road and the Paterson Plank road, West Hoboken; between Newark Ave. and Communipaw Ave., Jersey City, and from Communipaw Ave. to the Central Railroad bridge, Jersey City. The resolution provides that "every contractor in

the state shall have the fullest opportunity to submit a bid."

Princeton, N. J.—The borough will repair Mercer and Alexander Sts. and Bayard Lane if the State Automobile Department allots a sufficient sum from the automobile fund.

Princeton, N. J.—Petition will be presented to Council by property owners on Stockton St. asking permanent pavement.

Batavia, N. Y.—Messrs. H. A. Kahler & Co., New York, successful bidders \$29,700 refunding bonds, \$55,000 paving bonds.

Canisteo, N. Y.—March 20 the question of issuing \$14,500 depot street paving bonds will be voted on.

Fairport, N. Y.—All bids for the following bonds were rejected: Drainage, \$25,000; paving, \$21,000. The bonds will be readvertised at a later date. Geo. G. Mulliner, Village Treas.

Gloversville, N. Y.—East Fulton St. from Kingsboro Ave. to Fox St. to be graded and paved with bitumen.

Gloversville, N. Y.—The city attorney was ordered to draw resolutions attendant to requests to curb, gutter, grade and gravel the entire length of Burlington St., Ninth Ave. from Burlington to Kingsboro, and Tenth Ave. from Burlington east to Kingsboro.

Gloversville, N. Y.—Petitions filed by property owners for paving the following streets: East Fulton St., No. Main St., 7th Ave., Cottage St., Division St., No. School St., North St. and West 8th Ave., as well as the repaving of East Pine St., of Bleecker St. from Spring to North Sts.

Groton, N. Y.—For highway improvement bonds of \$6,000, the Isaac W. Sherill Co., Poughkeepsie, were the successful bidder. C. O. Rhodes, Village Clk.

Herkimer, N. Y.—Paving bonds aggregating \$6,926.51; the First Natl. Bank of Herkimer was the successful bidder.

Medina, N. Y.—Questions to be voted on at election of March 20 are: \$32,000 for the improvement and paving of Main and Commercial streets; and the sale of the Timmerman house now on the site of the new village park.

Olean, N. Y.—P. H. O'Mara of the Olean Trust Co., successful bidder for \$2,655 bonds covering the expense of paving West Sullivan St., from Fourth to Sixth St.

Rochester, N. Y.—The purchase of land to the value of \$2,400 for the extension of DeWitt St. was approved.

Rome, N. Y.—City Attorney O'Connor was instructed to prepare a bill to be presented to legislature requesting for an appropriation for the paving this summer of East Whitesboro St.

Elizabeth, N. C.—Bids received April 2, paving, curbing and fire equipment bonds to the amount of \$84,000. City Manager.

Newton, N. C.—County commissioners contemplate the question of submitting to the voters a proposition to issue \$400,000 road bonds.

Canton, O.—Engr. Sarver reported the cost of improving 16th St. northeast as \$8,000.

Canton, O.—Councilman Witter's resolution was adopted instructing Engr. Sarver to prepare plans and estimated cost of the improvement which totals about 300 ft. for paving of 12th St. N.W., from Broad to Wertz Ave., so that a paved thoroughfare can be made through to Meyer's Lake as the county and township are to pave the road from the city limits to the lake.

Canton, O.—See "Sewerage."

Canton, O.—Resolution passed for the paving of 6th St. N. E. from Mahoning Rd. to the creek and for the improvement of Bonnot Place N. E.

Canton, O.—City Engr. Sarver is preparing a list of street improvements upon which bids will soon be received by the city; include both paving and grading and sewer.

Canton, O.—County commissioners and County Highway Supt. Sickafoose decided to advertise for the approximate special assessment on four Stark county roads which it is proposed to pave this summer.

Defiance, O.—Defiance county road building campaign for the coming year calls for more than 100 miles of improvements to highways in every section of the county and for the expenditure of more than \$900,000. There are already under contract or nearly completed 48½ miles of roads, and the contract price for these totals \$370,000. In addition there are 58.75 miles of good roads projected, the contracts for which will be awarded before June.

Defiance, O.—Messrs. Breed, Elliott & Harrison of Cincinnati successful bidders street improvement bonds aggregating \$64,407.19, paying a premium of \$281.54.

Hubbard, O.—Village making plans paving streets and sidewalks.

Ironton, O.—T. M. Allyn of the Standard Slag Co. is advocating a test street to be constructed at Adams Lane, which is probably 1,500 ft. in length, constructed of three different materials—brick, concrete and slag—giving about 500 ft. to each of the materials.

Middletown, O.—Butler county will have four new roads this summer—The Hamilton-Scipio pike, the Hamilton-Carthage pike, the Hamilton-Middletown pike, and the Middletown-Franklin pike. These roads will be repaired as soon as the new bonds are sold.

Milan, O.—Formal approval has been given of the agreement with the County Comrs. and the State for the paving of Main St. and Lockwood St., as a part of the inter-county highway, and the Wheeling & Lake Erie R. R. has been called upon to co-operate in the preparation of plans for eliminating the grade crossing.

Montpelier, O.—Bids received Mar. 24 by Village Clerk Ed. Summers, improvement coupon bonds, Washington St.; \$12,000; East Ave., \$10,000.

Montpelier, O.—Street improvement bonds aggregating \$22,000 will be offered for sale March 31.

Ney, O.—Portion Main St. will be paved.

New Berlin, O.—Council passed a resolution instructing Swiley & Rice, engineers, 308 Folwell bldg., Canton, to prepare estimates on paving Portage St. from Main St. to the west corporation limits; also voted to establish grades on Bachtel St.

Paulding, O.—City receiving bids for paving streets.

Port Clinton, O.—Eight miles of new road have been petitioned for by the farmers of Ottawa county in the interest of the good roads movement. Three and a half miles to be improved in Carroll and Salem townships and 4½ from Martin to Williston.

St. Clairsville, O.—Bids received Mar. 26, County Highway No. 101 bonds of \$56,697. County Aud. Bert W. Hopkins.

Toledo, O.—City Engineer McClure will receive bids for paving Miami St. from Fassett St. to the city line, which is a part of the Dixie highway. Elm St. from Bancroft St. to the Manhattan road.

Toledo, O.—County Surveyor Road wants to reconstruct 22 county roads this year. The entire cost of these improvements, covering in all 64.3 miles of highway, \$46,900. Dorr St., Raab Rd., Albion Rd., Neapolis-Waterville Rd., Heller Rd., Wheeling St., Reynolds Rd., Hill Ave., Glendale Ave., Benore Rd., Long Rd., Michigan Ave., Laskey Rd., Corduroy Rd., Pickle St., Otter Creek Rd., Berkey Rd., Condon St., Engel Rd., Whiteford Rd., Swanton-Maumee Rd. and Waterville-Monclova Rd. This program does not include the reconstruction of state highways in this county, the River Rd. being one.

Woodville, O.—Village Clerk Otis Bittinger will receive bids March 31, \$11,439.35 first street improvement coupon bonds.

Poteau, Okla.—Bonds voted to build roads in La Flore county, Houston township.

Bend, Ore.—City Engr. Robt. Gould is preparing report for street committee regarding six miles of new sidewalks to be either cement or wood.

Portland, Ore.—The new plan to be worked out by Roadmaster Yeon will take care of every county road project asked, with the exception of the paving of the Columbia Slough Rd. and minor work. It will allow of the completion of the pavement of the St. Helens Rd. to the Columbia County line, for which \$240,000 was appropriated, and the making of road improvements on the Kiser Rd., Cornelius Pass, Skyline Rd., Sycamore Rd., Barr Rd., Buckley Ave. Rd., Rocky Point Rd., Foster Rd. and others.

Ebensburg, Pa.—Business men of the north of the county, residing in Patton, Carrolltown, Barnesboro, Hastings and Spangler, are planning to form a committee of prominent men to visit the county comrs. in the near future with a view to securing a brick highway from Ebensburg to the north of

the county. The county comrs. have set aside this year about \$130,000 or upwards, for the construction of better roads, and is now prepared to say to applicants for these "main" roads, that the county of Cambria is ready and willing to pay its share for making permanent the more important roads.

Enhaut, Pa.—Swatara Twp. Bd. will spend about \$7,000 on the improvements to the roads this year.

Franklin, Pa.—Burgess Jacob Rubright submitted his annual message to council, recommending repairs to River Ave., the placing of guard rails and river walls along River Ave., new bridges and the placing of a guard rail along the new road at the borough township line. This latter recommendation was acted upon at once, and the placing of a guard rail was authorized.

Hazletown, Pa.—Arrangements have been completed for letting out work on city paving and sewer work early this year.

Johnstown, Pa.—Councilman Thos. J. Harris, Supt. of highways, will present to Council estimates on the cost of paving: Franklin St., from Stephens St. to city line, brick on concrete base, \$29,100. Sell St., from present paving to city line; brick on concrete base, \$9,000. Paul alley, Franklin St. to Kennedy Ave.; one course concrete, \$375. Ordinances providing for the paving will probably be prepared shortly. Sanitary sewers must be laid before the paving is done. Sanitary Engineer C. P. Collins has prepared the plans for the laterals and is ready to advertise for bids. The contracts will be let soon.

Johnstown, Pa.—Council conferred with O. P. Thomas, borough engineer of Westmont, relative to the proposed improving of the Millcreek Rd., leading from the foot of Somerset St. to Westmont. The city is preparing to take action on its share of the cost of the paving of the road, which will mark an important step in establishing direct north and south route from Johnstown to the Lincoln Highway, cutting off 9 miles of the distance from the city to Pittsburgh.

A petition for the paving of the section of road in the city under the foot-front plan has been submitted to council. It was stated that the city would probably begin work on the installation of storm and sanitary sewers and prepare to pave its section of the road very shortly. County Surveyor O. P. Thomas has been instructed by the county to make a survey of the road. Section of road to be paved is less than a mile in length. Of this 927 ft. are in Westmont borough, 1,600 ft. in the city, 1,663 ft. in Westmont and Upper Yoder township jointly, the line separating the two running in the center of the road, while the remaining 510 ft. are in Upper Yoder township. The estimated cost of the paving of the road with brick and concrete is \$28,750. Of this sum the county would pay \$10,000, Westmont \$5,000, and Upper Yoder township \$2,500. The city's section amounts to \$11,250, but this would be paved under the foot-front plan, so that the city's cost would be one-third of this sum.

Lansdowne, Pa.—In the near future an election will be held to issue road improvement bonds of \$25,000.

Pittsburg, Pa.—P. J. McArdle offered City Council a comprehensive plan for the improvement of the downtown district embraced in several ordinances; widening Diamond St. from Ferry St. to Market Place to a width of 50 ft.; Diamond St. from Market Place to Smithfield St. to 60 ft. between Market and Wood Sts., and 68.06 between Wood and Smithfield Sts.; Diamond St. between Smithfield and Grant Sts. to a width of 54.54 ft.; ordinance widening Shingiss St., from Locust St. to Bluff St., and providing that the name be changed to 6th Ave.; ordinance opening 6th Ave. from Bluff St. to 2nd Ave., and another extending and opening 6th Ave. from Diamond St. to Locust St.

Pittsburgh, Pa.—Beechview Board of Trade appointed a committee to consult with Public Works Director John Swan on the possibility of compelling residents to pave and repair sidewalks.

Sayre, Pa.—The Council decided to hold an adjourned meeting on the 12th pavement work to be done this year. To meet the engineer regarding the pavement work to be done this year.

Williamsport, Pa.—Judge Harvey W. Whitehead has appointed a board of viewers in answer to a petition from

Pine township residents to act concurrently with a similar board appointed by the Tioga county court in making a view of a road in Morris township, Tioga county, and Pine township, Lycoming county. The road is said to be an old log road which will open up the territory in that section.

Williamsport, Pa.—The ordinance for the paving of Walnut St. between West Fourth St. and Park Ave., carrying an appropriation of \$2,465 passed second and third readings.

Williamsport, Pa.—A petition was presented from taxpayers of the Seventh ward asking for sidewalks to be built on the north side of Newberry St. between Poplar St. and Hillside Ave.

Williamsport, Pa.—The second bond issue ordinance for the proposed resurfacing of the asphalt pavements of the city was offered the city council and passed. Rate of interest is 4 per cent., and are to be known as the Williamsport 4 per cent improvement bonds; \$60,000 are for the purpose of resurfacing the asphalt streets of the city and for the construction of storm water sewers.

Williamsport, Pa.—Lycoming Motor Association stated that a determined effort will be made to have the road between Newberry and Jersey Shore improved. This improvement is not in line with the proposed Susquehanna Trail and an outside movement will be organized and everything possible done to have this section of road macadamized or paved with brick.

York, Pa.—Ordinance introduced to council authorizing the paving of Belvidere Ave. from Market St. to Philadelphia St. and West St. from Market St. to Philadelphia St. Chas. P. Schreiner, City Clerk.

Newport, R. I.—Resolutions to start the Bath Rd. widening work passed.

Westerly, R. I.—Approval of the extension of the paving of the Post Rd. from Westerly, three miles north, was given by the Town Council. Bituminous paving will be used. Peter J. Lannon, Clerk of the Bd. of Public Highways.

Anderson, S. C.—Messrs. Spitzer, Rorick & Co. of Toledo were the successful bidders for the paving bonds to the amount of \$125,000.

Chester, S. C.—The question of issuing \$450,000 road bonds will be voted on March 27. County Clerk W. Davidson.

Laurens, S. C.—The question of issuing \$300,000 road bonds will be submitted to the voters March 2.

Sumter, S. C.—Measure passed by General Assembly allows townships in Sumter Co. to vote bonds for road improvements and automobile tax will go towards paying interest and sinking fund provisions of bill.

Sumter, S. C.—The ordinance regulating the issue of \$75,000 additional street pavement bonds passed second reading.

Erwin, Tenn.—Messrs. W. W. Willis & Co. of Knoxville recently purchased at private sale, an issue of street paving bonds of \$45,000.

Lonsdale, Tenn.—City intends grading and surfacing numerous streets at cost estimated between \$30,000 and \$50,000. Dr. H. E. Christenberry, Mayor.

Amarillo, Tex.—City Mgr. M. H. Hardin will receive bids Mar. 20 for the following 5 per cent annual (Mar. 15) bonds: Paving, one 10-yr. (serial), \$10,000. Paving, one 40-yr. (serial), \$40,000.

Austin, Tex.—City plans paving West Ave. M. C. Welborn, city engr.

Houston, Tex.—An appropriation of \$2,000 was made from the general fund by the city council for the repair of permanent pavements about the city.

Huntsville, Tex.—April 7 the question of issuing \$25,000 Beldias District road bonds will be submitted to the voters.

Nequitte, Tex.—Citizens defeated \$6,000 bonds to improve streets.

Roby, Tex.—The road \$100,000 bonds defeated.

Provo, Utah.—An election to vote on issuing \$750,000 road construction bonds considered by Board of County Commissioners.

Roanoke, Va.—Council presented with a petition asking for the improvement of Riverland Rd.

Rustburg, Va.—The State Highway Commr. was authorized to employ a competent engineer to superintend the construction of certain improved roads in Brookville district at a salary of \$125 per month and expenses.

Rustburg, Va.—The State Highway Commr. was directed to advertise for bids for the construction of the roads in Seneca district, which are to be permanently improved with the proceeds of

the bond issue recently voted in this district.

Rustburg, Va.—\$850 was appropriated for the purpose of opening a new road known as the Red Oak Mountain Rd. in Rustburg district; also includes land damages and cost of erecting a bridge over a fork of Falling River, made necessary by the opening of the road.

Parkersburg, W. Va.—City council introduced street paving with brick 21st St. between Plum and Liberty Sts.; 22d St. between Dudley Ave. and Oak St.; Latrobe St., between 21st and 22d St.; George St., between 21st and 22d Sts.; also 20th St., between Dudley Ave. and Oak street, concrete.

Parkersburg, W. Va.—City engineer ordered to draw plans and specifications for paving with concrete Wood St. between Swann and Lynn Sts.

Colton, Wash.—Council plans paving principal streets this spring. Contracts for the work will be let late in March or first of April. One mile of street through the business center included in the work.

Everett, Wash.—City Commrs. awarded to Union Savings & Trust Co., Seattle, bond issue of \$7,431.12 for paving Wall St. This firm offered to pay \$101.42 for each \$100 bond, at 6 per cent.

North Yakima, Wash.—City to replace 111 blocks of wooden sidewalk with cement this spring.

Okeville, Wash.—Council plans some paving this year.

Spokane, Wash.—The County Commrs. will construct 24½ miles of permanent highway this year and the county engineer is now working on the plans.

Sunnyside, Wash.—Council has taken up the matter of paving Sunnyside Ave. and instructed City Engr. Fred Bankford to present facts and figures regarding cost of various materials.

Tacoma, Wash.—County engineer has been instructed to prepare survey of proposed road between Otting and Wilkenson.

Alma, Wis.—County will hold election Apr. 13 to vote \$350,000 bonds for proposed road construction work.

Ashland, Wis.—For about \$28,074, Ashland county plans improving highways.

Crandon, Wis.—Election to be held in April to vote on bond issue of \$100,000 for grading Forest county roads. C. G. Warnick, county auditor.

DePere, Wis.—Council ask for plans and specifications for proposed pavements: Lewis St., from Broadway to Erie; Merrill St., from Broadway to Erie; Grant St., from 5th St. to the east line of Lot 9, Block I, Dousman's addition; Main Ave., from 5th St. to 8th St.; 8th St. from Main St. to Birch Ave.

Rhineland, Wis.—An election will be held in April to issue \$140,000 road improvement bonds.

River Falls, Wis.—Bond issue of \$45,000 for paving Main St. sold.

Vancouver, B. C.—A programme for extensive repairs to streets, estimated to cost \$120,000, has been prepared by City Engineer F. L. Fellowes.

Halifax, N. S.—Widening of Buckingham St., between Barrington and Argyle, is being considered by the City Council. Acting city engineer, H. Johnson.

Guelph, Ont.—The City Council is considering the construction of a sidewalk on Elizabeth St., from Morris to Stevenson Sts. City engineer, F. McArthur.

Ottawa, Ont.—The Central Canada Exhibition Association, city hall, is considering the construction of macadam roads with Tarvia finish in the Exhibition Grounds.

Windsor, Ont.—Repairing a highway from Montreal to Windsor by way of London will start by the Provincial Public Works Department. George Hogarth, chief engineer, Highway Department, Parliament Building, Toronto.

BIDS RECEIVED AND CONTRACTS AWARDED.

(*Indicates Contracts Awarded.)

Fresno, Cal.—Bd. of Supvrs. accepted bid of the Union Oil Co. to furnish the county from 80,000 to 100,000 bbls. of crude oil for putting on county roads, at \$1.25 per bbl.

New Haven, Conn.—Dept. of Public Works for supplies for the coming year as follows: Lumber, the "George Alling's Sons" Co.; cement, the "Connecticut Adamant Plaster Co." sewer castings, the "Sessions Foundry Co., Bristol; curb stone, the "Howard Co." granite catch basins, the "New Haven Stone, Marble & Tile Co." sewer piping, the "Jordan Co."

South Manchester, Conn.—By city, *W. F. Potter, Montowese, Conn., at \$20,000,

to construct concrete walks and granite curbs on various streets.

Braidwood, Ill.—County Highway Superintendent Smith of Joliet; Ole Nelson, Dennis Rae and Thos. Serena, commissioners, to improve the "Burlington Way" through Reed Twp.; a water-bound macadam roadway for one mile, extending north and south between sections 4 and 5, better known as the "Gin Shaft" Rd. *Mayor L. B. Carpenter, at \$2,297.

Peoria, Ill.—For the improvement of Galena road for a distance of two and one-half miles. The Stocker Gravel & Constructoin Co. of Highland, Ill., bid \$37,694.84 and the Keokuk Quarry & Construction Co., Keokuk, Iowa, \$37,086.20. Estimate prepared by County Superintendent Emery, \$39,000. Bids were taken under advisement, road and bridge committee of the board of supervisors. A. B. DeBord of Princeville is chairman of the committee.

Peoria, Ill.—*Miller & Biehl, 608 Smith St., at \$18,711 for paving. Board of local improvement, E. N. Woodruff, chairman.

Springfield, Ill.—The following state aid contracts were awarded by the State Highway Commission, Feb. 28: *D. E. Shively, Cerro Gordo, Ill., McDonough county, Sec. F. route 1, type earth, amount \$2,513.22; Sec. G, route 2, type earth, \$2,297.83; Sec. H, route 4 A-4, type earth, \$2,182.67; Sec. I, route 5, type earth, \$2,054.45.

West Frankfort, Ill.—*John Dorris, Jr., Harrisburg, Ill., at \$78,249, engineer's estimate \$79,685, to pave 34,600 sq. yd. with one-course concrete (1:2:3), with 2-in. granite on two-course concrete (1:2:4) base, triangle mesh steel wire reinforcing; other bidders, Hoeffken Bros., Belleville, Ill., \$81,526; Western States Constr. Co., Omaha, Neb. \$86,567; Dunlap & Dippold Co., Terre Haute, Ind., \$88,805. P. B. Wilson, engineer, Marion, Ill.

Bloomington, Ind.—The county commissioners let *Campbell & Dobson to build the Charles Steinhagen pike road in Bean Blossom township of nearly two miles, \$8,220.

Brasil, Ind.—County commissioners for the construction of the Samuel Hadden et al. road in Jackson township to *Keegan Bros., for \$8,789. Scott Johnson was appointed superintendent of construction.

Decatur, Ind.—Adams county commissioners for roads as follows: Jefferson Twp., *W. V. Buckmaster, \$3,680; Blue Creek and St. Marys Twp., *David Gerber, \$3,375; Wabash Twp., *Smith & Mathys, \$3,975; Wabash Twp., *Smith & Mathys, \$7,000; Washington and Root Twp., *A. H. Frey, \$23,478; Hartford Twp., *L. O. Bears, \$4,749; Kirkland Twp., *Chas. Arnold, \$4,645.

Evansville, Ind.—The county commissioners of Vanderburg county, *S. R. Adams Company, for \$6,383, for improving with macadam the new Green River road in Knight township.

Franklin, Ind.—Johnson county gravel road to the following: *J. E. Myers, Greenwood, Ind., \$9,980; *J. E. Enos, Morgantown, Ind., \$9,733; *J. M. Murphy, Greenwood, Ind., \$9,700; *J. R. Rivers, Bargserville, Ind., \$3,645.

Greencastle, Ind.—*G. B. Parker of this city from city council to improve Bloomington St. with sidewalks, curbs and gutters, about \$6,700.

Greensburg, Ind.—For furnishing ten carloads crushed stone to Decatur county, *Greeley Stone Co., of St. Paul, Ind., \$1.25 and \$1.37½ per cu. yd.

Greensburg, Ind.—County Commrs. let *William Avery, Waldren, Ind., for the Patterson road in Washington Twp., at \$14,770; for 4,500 cu. yds. of crushed stone was given to *George Littell at 99 cts. per sq. yd.

Huntington, Ind.—Board of county commissioners let for four roads: *Huffman Bros. for two of the roads, the Wildermuth road in Wayne township, for \$12,490; Lawrence road in Jefferson township for \$7,671. *Michael Crowe for the Smith road in Jackson township for \$15,642. *Samuel Palmer for the Foulke road in Dallas township for \$4,700.

Laporte, Ind.—*Frank J. King of this city, paving of T-ler and E Sts. The contract price for the city's part of the work, that is, the two 5-ft. strips on each side and the curb and other work, is \$16,992.46, as tabulated by Carl Kuester of the engineer's office. Metropolitan brick will be used; on the brick work, was \$1.95 per sq. yd., exclusive of the filler. Filler, 12 cts. per sq. yd.; cement curb, 35 cts. per lin. ft.; sidewalk, 14 cts. per sq. ft.

Monticello, Ind.—For White county

roads as follows: *Harry M. Bell, Logansport, Ind., Tarvia bound macadam road, \$32,600; *G. A. Kellenburger, Reynolds, Ind., gravel road, \$3,925; *O. E. Shafer, Royal Center, Ind., gravel road, \$6,299.

Mt. Vernon, Ind.—*L. J. Utely, Mt. Vernon, Ind., and *Thomas, Bennett & Thomas, also of Mt. Vernon, were the successful bidders for Posey county road contracts.

Portland, Ind.—For a gravel road for Jefferson township, Jay county, *Harry Iliff, of Portland, Ind., for \$11,350. For a crushed stone road for Greene township, to *Earl Lyons of Union City, Ind., for \$7,000.

Plymouth, Ind.—For construction of roads in North and Center Twps., Marshall county, to *Homer L. Short, of Lakeville, Ind., and *Ellison & Co., of Monroeville, Ind., at \$8,199 and \$8,515. Contract for the Polk Twp. Rd. was not let and will be readvertised.

Rockville, Ind.—For gravel roads in Penn and Greene townships, Parke county, *H. L. Britton of Judson, Ind., and *W. G. Carty, Montgomery, Ind., at bids of \$7,300 and \$4,900, respectively.

Rushville, Ind.—For construction of 13,950 ft. cement roadway in the city of Rushville, to *Edward G. Gant, of Greenfield, Ind., \$45,250.

Valparaiso, Ind.—*Green & Coffin of Valparaiso, Ind., were the successful bidders for two miles of gravel road in Boone township, Porter county, securing the contract at a bid of \$14,600.

Vincennes, Ind.—For three Knox county roads *McClure & Roble, Vincennes, Ind.; *J. S. Taylor, Vincennes, Ind.; Frank P. Utt, Bruceville, Ind.

Wabash, Ind.—*Chas. Zigler, of Wabash, Ind., construct a gravel road for Wabash county at a cost of \$12,470.50.

Davenport, Ia.—Scott county roads and bridge material and work for the coming year, aggregating \$26,234 in value, let by board of supervisors. The following were the bids accepted: Des Moines Steel Co., reinforcing bars, average price, \$3.58 per 100 lbs.; *Wheeler Lumber, Bridge & Supply Co., of Des Moines, 20,000 ft. of lumber, average price, \$27.50 per thousand; H. O. Seiffert Co., Davenport, 2,000 lbs. cement, \$2.16 per barrel (10 cts. each refund for empty sacks); *August Kornemann, Muscatine, grading the Eldridge-Long Grove road improvement, 38 cts. per cu. yd., 25 cts. per lin. ft. for piping; *William Rathlef, Eldridge, 11 cts. per lin. ft. for tiling right of way, Eldridge-Long Grove road; *Fuller Bros. & Co., Muscatine, grading Princeton road, 36 cts. per yd. for dirt excavation, 72 cts. per yd. for loose rock and \$2 per yd. for solid rock; 15 cts. per ft. for piping; *John Anderson & Son, of Maquoketa for the concrete work on the 13 culverts to be constructed in the county during the coming year; \$6,320 for the entire job.

Denison, Ia.—Crawford county supervisors let road improvement. The average price per cu. yd. is 19.184 cts. The total estimated yardage is 456,392 cu. yds., about 35 1/2 miles, and the total cost will be \$87,553.89. The work is divided into 8 groups, so that a camp can be established and work more than one piece without moving. *George W. Condon, group 1, estimated yardage 60,000, \$17.42 per cu. yd., amount \$1,045.2; group 5, 55,000 estimated yardage, \$17.42 per cu. yd., amount \$9,581; group 7, 56,000 estimated yardage, \$16.85 per cu. yd., amount \$9,436; group 8, 60,947 estimated yardage, \$16.85 per cu. yd., amount \$10,269.57; *Thomas Carey & Sons, group 3, 48,253 estimated yardage, \$21 per cu. yd., amount \$10,133.13; group 4, 50,878 estimated yardage, \$19.95 per cu. yd., amount \$10,150.15; group 6, 88,314 estimated yardage, \$22 per cu. yd., amount \$19,429.08; W. R. Shipman, group 2, 37,000 estimated yardage, \$21.90 per cu. yd., amount \$8,103.

Irvine, Ky.—Estill County, *Mills & Howell, Frankfort, Ky., macadamizing and resurfacing Richmond Rd., at \$6,587. J. E. Alexander, Clk, Irvine, and State Comrs. of Pub. Roads, Frankfort, Ky.

Southampton, L. I.—Village trustees let contracts to lay a road on Main St. and Job's Lane, in this village. *Standard Bitulithic Co., of Hempstead, \$1.89 a sq. yd. It is estimated that there are 28,000 sq. yds. of surface in the roadway. The taxpayers recently voted \$50,000 for this work.

Baltimore, Md.—Bids were opened by the board of awards for the paving of 16 streets in the annex under specifications prepared by the Annex Commis-

sion. The American Paving Co.'s bid of \$1.81 was the lowest.

Leominster, Mass.—Supt. James H. Johnston purchased for the highway department at \$3,800 a 16-ton Buffalo steam roller.

Waltham, Mass.—For the city supply of oil for road sprinkling purposes to *Alden Spears Sons Co. Requests were made for estimates under three classifications, as follows: Class A, non-asphaltic road oil supply of 90,000 gallons; Class B, light asphaltic road oil for dust laying, supply of 90,000 gallons; Class C, 65 per cent. asphaltic road oil. There was no award made for Class B as the other two materials are to be used for street sprinkling and surface preparation work. The bids as follows: Boston Engineers' Supply Co., A, .1029 f. o. b. Walton, Alden Spears Sons Co., A, .0925 f. o. b. Walton, .1025 spread; B, .09 and .10; C, .0695 and .0820; *Barrett Co., Class C (Tarvia B), .061 and .0749; Standard Oil Co., B, .066 and .08; B, .066 and .08; Barber Asphalt Paving Co., C (tank cars), .083; bbl. a, .115; bbl. c, .116. Award under Class A, Spears Sons Co.; Class C, to the Barrett Co.

Duluth, Minn.—County board awarded for road work and authorized several appropriations in the various districts. *Andrew Hanson, Kirksville, Mo., for clearing the Sundvick road, also in the \$800 for the 3 1/2 miles; *Charles Hill for clearing the Sundvick road, also in the Fifth, \$20 an acre for a distance of 3 miles.

Chillicothe, Mo.—City council, for 20 manholes, to *Chillicothe Iron Co. Will be used on the streets which are to be paved during the summer.

Hackensack, N. J.—Improvement Commission let for the laying of oil and tar and the construction of concrete sidewalks and curbs: The *Standard Oil Co., for road oil, \$0.767. Tar, to *Wm. S. Logan, 9 Clinton St., Newark. The *Standard Construction Co., for the construction of concrete sidewalks and curbs, 13 1/2 cts. per sq. ft. for sidewalks and 32 1/2 cts. per lin. ft. for curbs.

New Brunswick, N. J.—Board of Freeholders received lowest bids to repair South Amboy-Sayreville road: Liddle & Pfeiffer, \$52,571; Graham & McKeon, both of Perth Amboy, N. J., \$53,057; Utility Construction Co., New Brunswick, N. J., \$54,098.

Chicago Junction, O.—*C. H. Au, Mansfield, O., paving and curbing Park St., Woodland Ave. to Long St., at \$15,917.

Columbus, O.—For grading, paving and curbing, as follows: Brick in Tibet Rd. *D. E. Sullivan & Sons Co. Electric Building; Pearl St., brick, *B. F. Patterson, 1214 Nell Ave.; Hinman Ave., asphalt, *Andrews Asphalt Paving Co., Hamilton, O.; alley north of Northwood, *Geo. Geigle & Son, 52 E. Fulton St.; Alden and Oakley Aves., *Federal Paving Co., 604 Hartman Building; Wilson Ave., *Fletcher Bros., 1591 Harvard Ave.; 19th Ave., *Legg & Davis, 2080 N. High st.; 2d alley west of 4th Ave., *Geo. Geigle & Sons, 52 E. Fulton St. Dept. of public service, Geo. A. Borden, director; Paul B. Kemper, clerk, let contracts, Henry Maetzel, city engr.

Columbus, O.—*Geo. Geigle & Son, 52 E. Fulton St., sidewalks, High St. Engr., Henry Maetzel, city hall. Geo. A. Borden, director public service; Paul B. Kemper, clerk, city hall.

Lima, O.—Forty-nine bids on eight street improvements were submitted to the city by nine different firms, six of whom were Lima contractors. Work on the tabulation of the bids was started at once by City Engineer Vaughn Miller, Lima. Bidders: Mullen-Blodgett, H. L. Solomon & Co., Jamison & Blosser, Summers & Hardin, R. Stone and Henry S. Enck. Outside bidders: Columbus Asphalt Paving Co., Columbus; Andrews Paving Co., Hamilton, O., and H. P. Etrelcher Co., Toledo.

Philadelphia, Pa.—To construct concrete curbs, copings posts and balustrades and concrete pavements, as follows: To *Chas. T. Groszwith, 3435 Chestnut St., at \$23,723, in Wm. Lanier Park, and at \$10,000, in Bartram Pk.; to *Edw. Fay & Son, 2 South Mole St., at \$8,640, on 24th and Jackson Sts. By Bureau of City Property; bids opened Feb. 7.

Seattle, Wash.—County commissioners for paving the Mercer Island road, as follows: County engineer's estimate, \$15,249; *D. J. McLean, \$15,167.42; E. Mattson & Son, \$15,249; G. A. Banderet, \$15,399.50; E. J. McQuaid, \$15,563; M. P. Zindorf, \$15,985.10; L. H. Goerig, \$16,425; Gallagher Const. Co., \$16,600; E.

Driscoll, \$17,444.33; Sloane Bros., \$17,471.85; R. E. Russell, \$19,000; Hartvig Espiland, \$19,000; A. Rydstrom, \$19,770; P. O. Turnberg, \$21,457.67; J. N. Lawlor, \$21,740.

Seattle, Wash.—Board of county commissioners for the paving of Highway No. 15 between Duval and Novelty, to *Ericson, Anderson & Hicker, 1002 N. Ainsworth Ave., Tacoma, \$24,918.36. Will be surfaced with concrete. Engineer's estimate, \$21,403.06.

SEWERAGE.

Birmingham, Ala.—Ordinance approved for construction sanitary sewer in 11th St. alley north.

Edmonton, Alta.—Plans and an estimate of the cost of extending the sewer to the Burn's packing plant has been prepared by City Engineer A. W. Haddow.

Edmonton, Alta.—Acting City Engr. A. W. Haddow has recommended the construction of a sewer in the lane west of 127th St., between 109A Ave. and 113th Ave. Estimated cost, \$7,100.

Globe, Ariz.—To prepare plans for sewerage system city has engaged Olmstead & Gillelen, 1112 Hollingsworth Bldg., Los Angeles, Cal., cost about \$217,000.

Folsom, Cal.—The sanitary board employed Albert Givan, an engineer, to plan and supervise the construction of the Folsom, Sacramento county, sewer system for which bonds were voted.

Los Angeles, Cal.—Ordinance of intention adopted for sanitary sewer work in Lillian Way between Santa Monica Blvd. and Lexington Ave.

Marysville, Cal.—City Engineer W. M. Meek has submitted to the city council an estimate on the proposed extension of the sanitary sewer system along Pine St. from First to 13th and along the alleyway between Swezy and Ramirez Sts. from 10th to 13th, showing a probable cost of \$3,000.

Sacramento, Cal.—City Comm. passed resolutions for sewers in several streets.

Emmett, Ida.—Bond election providing for issuance of \$17,000 bonds for modern sewerage disposal works, carried recently. Bids for construction will be in at an early date.

Quincy, Ill.—City contemplates constructing three small sewers; cost \$20,000. D. Schroer, City Clk.

Brazil, Ind.—City engaged Pierce & Greeley, Chicago, Ill., prepare plans for sewage disposal tank at mouth of Pogue Run; estimated cost, \$30,000.

Marshalltown, Ia.—Council passed resolution for storm sewer in the Third Ward, designated as Dist. No. 16, and comprising about 31 sq. blocks.

North McGregor, Ia.—March 26 town will vote for the purpose of issuing bonds for construction of sewer system.

Dodge City, Kan.—City contemplates sewer improvements. W. E. Baldry, City Engr.

Hutchinson, Kan.—An ordinance providing for a submain sewer and a lateral sewer on South Plum St., was introduced.

Hutchinson, Kan.—Third and Fifth Ward Improvement Club adopted unanimously a resolution to begin work at once with petitions asking for additional sewers in the southwest part of the city and it is expected the city comm. will order them laid this summer.

Wichita, Kan.—City considering a \$200,000 sewer system. H. D. Lester, City Clk.

Louisville, Ky.—For repair of Preston St. outlet sewer. Bids for reconstruction were rejected. Roy Bucks, City Hall, is revising plans. Board of Pub. Works will advertise for bids later; vit. brick, Roger McGrath, Secy., City Hall.

Baltimore, Md.—See "Water Supply."

Muskegon Heights, Mich.—For construction of sewers and sewage disposal plant city voted \$110,000 bonds. Hood & Decker, Engr., Ann Arbor.

Sault Ste Marie, Mich.—First resolutions for the Magazine St. sewer were adopted by council. The estimated cost \$2,725.

Chillicothe, Mo.—City to lay a sewer on Wise St.

Joplin, Mo.—J. F. Lee, comr. of Pub. Utilities, probably will offer an ordinance to submit the question of building a new municipal light plant at a cost of \$190,000. Comr. Hodgdon probably will advocate a \$200,000 bond issue for sanitary sewers and Dr. R. B. Tyler, comr. of health, will urge the submission of his plan to spend \$60,000 on a city hospital.

Joplin, Mo.—See "Miscellaneous."

Plattsburg, Mo.—City will vote on a \$30,000 sewer proposition shortly. Engineer, E. B. Murray, 920 Walnut St., Kansas City, Mo.

St. Joseph, Mo.—Mayor Marshall, in message to council, recommends for immediate action a \$900,000 bond issue for the issue and sale of \$550,000 bonds for construction of public sewers; \$100,000 for fire houses and water equipment for the fire department; \$200,000 for remodeling and extending the city light plant; \$25,000 to erect necessary emergency hospital on city property; \$25,000 for the erection of a city workhouse. Also sees the need for a new asphalt plant and flushing machine.

Big Sandy, Mont.—See "Water Supply."

Scobey, Mont.—See "Water Supply."

Valentine, Neb.—W. E. Haley, City Clk., Valentine, will call for bids on a \$20,000 sewer system.

Newark, N. J.—City plans sewer portion Jefferson St. C. H. Wells, City Engr.

Passaic, N. J.—Board of commissioners have decided not to construct the \$50,000 Paulison Ave. storm sewer.

Rahway, N. J.—Board of health to ask council to provide sewers in the sections of Maple and West Hazlewood Aves.

South Orange, N. J.—For trunk sewer system for South Orange Twp., Rahway, Cranford, and other municipalities that may care to enter the project. Clyde Potts, 30 Church St., New York, has drawn plans. A. W. Hemphill, of Montclair, reported head of private interests, which are considering the construction.

Trenton, N. J.—City considering sewerage disposal plant. Commissioner Fell has started to obtain prices for a system similar to that proposed for Phillipsburg, and it has been estimated that its cost would not exceed \$60,000 and the plant serve Trenton for from 10 to 15 years. The city has acquired many acres of land for a site along the river front below Riverview Cemetery. The system proposed for Trenton has just been approved by the state board of health for Phillipsburg, and calls for a fine sewage screen, with sewage later disinfected by chlorine gas. The original plans for a sewage disposal plant for this city called for an expenditure of about \$500,000.

Canandaigua, N. Y.—Mayor Peter P. Turner has appointed a committee to investigate sewer conditions and to ascertain what must be done to overcome the conditions complained of by residents of Shortsville as to the pollution of Canandaigua outlet. Settling tanks could be used and would not cost more than \$15,000.

New York City, N. Y.—Engineers of the sewer bureau of Queens have completed plans for the drainage system for North Beach, Woodside, Winfield and Jackson Heights; cost almost \$2,000,000. Borough President Connolly will submit the plans to the board of estimate for approval.

Niagara Falls, N. Y.—The Buffalo Ave. sewer bids and across lands of Niagara Falls Power Co. were rejected by city. Will readvertise. W. B. Bennett, City Engr.

Rome, N. Y.—See "Water Supply."

Rome, N. Y.—Water and sewer board presented the following estimate for sewer funds for the ensuing year: Sewers that have been approved but not constructed, \$5,000; prospective sewer construction, \$3,000; maintenance, \$1,500; repairs, \$1,000; total, \$10,500.

Hickory, N. C.—In the near future an issue of refunding sewer bonds to the amount of \$11,000 will be placed on the market.

Mebane, N. C.—See "Water Supply."

Dickinson, N. D.—See "Water Supply."

Barberton, O.—City voted a \$250,000 bond issue for a complete sewer system.

Canton, O.—Legislation for a bond issue of \$180,400 was authorized by council for new improvements this year; \$77,000 for the construction of storm sewers in the southwest end; \$22,000 for the city portion of Dartmouth Ave. S. W.; Scoville Ave. S. W.; Liberty Ave. S. E.; Newton Ave. N. W.; and Spring Ave. N. E. paving jobs; \$6,400 for 15th St. N. E. improvement; \$17,800 property portion Scoville Ave. S. W.; \$17,100 property portion Liberty Ave. S. E.; \$9,300 property portion Newton Ave. S. W.; \$14,300 property portion Spring Ave. N. E.; \$3,900 14th St. N. E. improvements; \$7,600 2nd St. S. W. Duerber to Park Ave. S. W.

Canton, O.—Engr. Sarver was authorized to prepare plans and the estimate of the cost of a storm sewer in Second St. from Cleveland Ave. N. W., to Walnut Ave. N. E.

Canton, O.—Ordinance passed to proceed with the improvement of Webster Ave. N. E. and Edward Ave. N. E., and with the construction of a sanitary sewer in 8th St. N. E.

Cincinnati, O.—For constructing sewers in portions of Paxton road and Baltimore Ave., no bids received by Chas. F. Hamberger, Dir. Pub. Service.

Hubbard, O.—Village making plans sanitary sewers.

Lima, O.—Council may consider a proposition to submit a bond issue to a vote of the people for the construction of an adequate sewer system.

Mansfield, O.—Portion of Grant St. to have an 8-in. sanitary sewer.

Middletown, O.—Resolution adopted to improve Henry Ave. from Elwood Ave. to First alley west of Elwood Ave., by the construction of a tile storm and sanitary sewer and house connections. Plans, specifications, estimates and profiles prepared by the city civil engineer. John Kunz, Clerk.

Middletown, O.—Resolution adopted to improve Van Ave. from First alley west to Elsemere Ave. to First alley east of Elsemere Ave. by the construction of a tile storm and sanitary sewer.

Middletown, O.—Resolution adopted to improve Crescent Blvd. from Elsemere Ave. to Malvern Ave. by the construction of a tile storm and sanitary sewer and house connections.

New Berlin, O.—The village sewers are wholly inadequate, owing to a great amount of building now in progress and the spreading out of the town. The village water mains, councilmen declared, should be extended. No action was taken on this matter, but according to Mayor C. H. Shafer this will be one of the big problems for council to solve immediately.

Shelby, O.—Bids received Mar. 30 for sewer coupon bonds, \$5,100. Village Clerk Bert Fix.

Wilmington, O.—For about \$113,000, city will shortly let contract sewer system.

Alva, Okla.—Sanitary sewers in several streets considered.

Jenks, Okla.—March 17 an election will be held to vote on issuing \$12,000 sewer bonds.

Astoria, Ore.—Notice of intention to construct sewerage and drainage district No. 3 are now being published. The district will embrace a large area. Costs not given. G. T. McLean, city engineer.

Allentown, Pa.—Site has been purchased for sewage disposal plant and sewer system will be installed; cost about \$2,000,000.

Cheltenham, Pa.—May 1 town will vote on a \$623,000 bonds to install sewer system.

Harrisburg, Pa.—City plans sewers in Beaver, Ruby, Berryhill, 21st and Central Sts.

Hazleton, Pa.—See "Streets & Roads."

Johnstown, Pa.—Council may submit a \$2,000,000 bond issue for improvements to voters at the general town election next fall. Program includes the building of new bridges, the acquisition of new park, the extension of the sanitary sewer system, the establishment of a municipal garbage collection and disposal plant, and some of the plans already outlined by the city planning commission.

Johnstown, Pa.—See "Streets and Roads."

Ogontz, Pa.—An election will be held May 1 to vote on issuing \$625,000 sewerage system bonds. Borough Secretary Harold C. Pike.

Williamsport, Pa.—See "Streets and Roads."

Williamsport, Pa.—City Council may co-operate in the housing development project and make the necessary improvements in streets in close proximity to the land in Tenth Ward. Storm sewer and paving for Cemetery St. is recommended, and other improvement may also be expected. Engineers are engaged in making preliminary surveys for the Board of Trade on this land. When data is complete the Dodson Realty Corp., of Bethlehem will likely be asked to prepare a definite report.

Newport, R. I.—A resolution directing the Board of Aldermen to secure plans and specifications for sewerage, along the east side of Almy's Pond, passed.

Westerly, R. I.—Town council will hold a hearing March 2 to discuss methods and rates of taxation for the new sewerage system that is to be installed. Thomas McKenzie, supt. of the water works.

Newport, Tenn.—City plans improving sewer system. C. B. McNabb, city engr.

San Antonio, Tex.—Ordinance passed for the construction of a new storm sewer in Alamo plaza, as the one now in use is owned by the United States Government and not large enough. The government also was granted permission to construct a main running from Crockett St. and Alamo plaza to the river. The sum of \$1,200 was appropriated as the cost of the work to be done by the city.

Altavista, Va.—See "Water Supply."

Spokane, Wash.—Commissioner of Public Works Funk will send to the city council a recommendation proposing the construction of a \$200,000 sewer system to serve the downtown district, beginning at Main and Lincoln and running east on Main to Stevens, south to First and west to Howard.

Beaver Dam, Wis.—Sanitary sewer portion West Maple St. Board of public works will shortly receive bids.

Kilbourn, Wis.—March 30 sewer system bond issue \$20,000 will be submitted to the voters.

Trail, B. C.—See "Water Supply."

Halifax, N. S.—For supplying 2,000,000 lbs. of Portland cement to H. Calder & Co.

Montreal South, Que.—At cost about \$180,000 a scheme for the construction of water and drainage system has been ratified. This drainage system will connect with the proposed intercepting sewer for the South Shore, or with an outlet into the St. Lawrence. Preliminary plans have been prepared by E. Drinkwater, of St. Lambert, Que.

Niagara Falls, Ont.—City council appropriated \$1,200 for sewer; \$1,200 new catch basins and repairs; fire and water, \$19,340.

Torrington, Wyo.—Planning 6,000 ft. sewer extension.

BIDS RECEIVED AND CONTRACTS AWARDED.

(*Indicates Contracts Awarded.)

Sacramento, Cal.—City Comm. opened bids Feb. 20, sewers, Block 3 and 4, Boxler Tract and alley first south of Park Ave. in W. J. Lander's addition "C"; *F. E. Frey, M. J. Desmond, City Clerk.

Shelbyville, Ind.—Hartman Const. Co. of Hartford City, Ind., for Tompkins St. storm sewer, Shelbyville, Ind., for the sum of \$15,797.75. Geo. J. McBride, City Civil Engr.

Knoxville, Ia.—Lateral sewers; *R. C. De La Hunt, Cedar Rapids, \$23,551; main sewers, *Moore-Sieg Constr. Co., Waterloo, \$4,010; sewage disposal plant, *Ward & Weighton, Sioux City, \$7,135. M. G. Hall, Con. Engr., Centerville.

Cleveland Heights, O.—*George Bros., 1448 Bolivar Rd., Cleveland, sewer and water curb connections, various streets; 43,600 lin. ft. 6-in. curb connections. Engr., F. A. Pease Engr. Co., 804 Marshall bldg., Cleveland. H. H. Canfield, Village Clk., Town Hall, Cleveland Heights.

Cincinnati, O.—*Welling & Franz, 9th and Plum Sts. sewer, ravine east of Colerain Ave. Engr., Frank S. Krug, City Hall. Chas. F. Hornsberger, Dir. Pub. Service. Edw. P. Durr, Secy., City Hall.

Cincinnati, O.—*Hollander Plug Co., Wilstack and Dalton Ave., sewer Baltimore Ave. Engr., Frank S. Krug, City Hall. Chas. F. Hornsberger, Dir. Pub. Service. Edw. P. Durr, Secy., City Hall.

Fremont, O.—For 920 ft. 12-in. and 75 ft. 9-in. vit. sewer, 3 brick manholes, and 6 inlets in Haynes St.; *Wilson & Butler, Findlay, O., at \$5,000. George Leshner, Engr., Fremont.

Toledo, O.—*J. N. Bick, 607 Nasby Bldg., Sewer No. 35, Upton Ave., 6,700 ft., 6 and 8-in. vit. sewer pipe, 13 conc. manholes, 5,800 ft. 6-in. Class B water pipe, at \$17,979. San. Engr., L. A. Boulay, Court House. Chas. Lanzenbacher, Audr., Lucas County.

New Wilson, Okla.—City for constructing sewers to *McIntosh & Walton, Oklahoma, at \$29,700.

Houston, Tex.—By the council for the erection of a sanitary sewer on Harrisburg road from Lenox to Latham Sts., *C. P. Hunter at \$600.

Houston, Tex.—Sanitary sewer to *Horton & Horton, local contractors, by the city council. The new system on Bayou St., amounting to approximately \$27,000 and a like system on Clarke St. from Odin to Kline, \$2,500.

Houston, Tex.—For the new storm sewer on Bryan st. from Harrisburg road to Hill St., *Freund & Quay, at \$19,000, by the city council.

WATER SUPPLY.

Redding, Cal.—Petitions were circulated in Redding, Shasta county, asking the legislature to enact laws that would permit that city to increase its bonded indebtedness by \$110,000 for the purpose of constructing a municipal water system.

Sacramento, Cal.—With the object in view of converting the voters of Sacramento to the cause of a bond issue for improving the river water supply, the city board of health passed a resolution recommending the installation by the city, as soon as possible, of a miniature filtration plant. Based upon figures supplied by Professor C. G. Hyde, one of the experts engaged by the commission about a year ago to investigate the water supply problem of this city, it is estimated that the construction of the model plant will cost \$1,000. It is proposed to keep the small plant in operation for four months, so that every person in the city will be afforded an opportunity to sample and test the filtered water in any way desired. At the end of that period, including the time necessary for installing tanks and other apparatus, which will require about three weeks, the city, it is expected, will be ready for a bond issue. A permanent filtration plant of the type and size needed by this city will cost \$1,223,000, it is estimated.

San Diego, Cal.—Spitzer, Rorick & Co., Toledo, at a premium of \$6,170 for \$100,000 issue of water improvement bonds issued by the city almost two years ago, highest bidder; next bid, the Bank of Commerce & Trust Company, of San Diego, \$6,137; G. G. Neumeyer, of San Francisco, \$6,050, and the Provident Bank & Trust Company, of Cincinnati, O., \$1,780.

Woodland, Cal.—For water mains, 4 to 8-in. c. i. pipe, city board will spend about \$40,000.

Englewood, Colo.—To issue \$200,000 bonds to be used for water works, election probably will be held in April.

Florence, Colo.—Election to issue bonds to be used for improving reservoir and water system may be held.

New Castle, Del.—To cost about \$20,000. Delaware Water Improvement Co. plans to rebuild plant recently destroyed by fire.

Cochran, Ga.—An election will be held Mar. 27 to vote on issuing \$3,000 water and light extension bonds.

North McGregor, Ia.—An election will be held Mar. 26 for purpose of issuing bonds to be used for construction of water works.

Kansas City, Kan.—City plans 10,000-gal. reinforced concrete reservoir. D. Douglas, Supt.

Baltimore, Md.—Work on a new water and sewerage system at the House of Correction is about to begin. The last legislature appropriated \$40,000 for the purpose.

Wenham, Mass.—Town voted to build a fire cistern at Larch row and Grapevine road at a cost of \$350.

Wenham, Mass.—The question of motor apparatus for the fire department and town water supply items referred until March 14.

La Plata, Mo.—Election will shortly be held to vote on issuing bonds for water works.

Lathrop, Mo.—An election to vote bonds for water system will be held shortly.

St. Joseph, Mo.—See "Sewerage."

Big Sandy, Mont.—The Minnesota Loan & Trust Co. of Minneapolis successful bidder for water works and sewer bonds to the amount of \$29,300. Hans H. Lehfeld, Town Clk.

Great Falls, Mont.—See "Streets and Roads."

Scobey, Mont.—For water and sewer systems election March 20 to issue \$70,000 bonds.

Hoskins, Neb.—Citizens voted \$8,500 water works bond issue.

Reno, Nev.—City has asked the California state water commission for an appropriation of 20,000-acre feet of water from Dig Creek in Sierra County, for the use of its municipal water system, construction to cost \$210,000.

Westfield, N. J.—An election will be held March 20 on question of improving present water works, cost \$30,000. Clyde C. Hill, Village Engr. J. A. Riley, Village Clerk.

Rochester, N. Y.—Bd. of Estimate approved the Mayor's resolution for the purchase of the entire water system of the Rochester & Lake Ontario Water

Co. in Denise Rd. and Lake Ave. Blvd., in the 23d Ward, for \$1,033.37.

Rome, N. Y.—Common Council presented with estimate of the water and sewer bond for \$10,300 for sewer, and of the fire and police, \$32,578.81; referred to Finance Committee.

Watertown, N. Y.—Mayor urges Council that an early development of the municipal water power plant by the city be investigated; believes that such improvement necessary to place in operation at least one unit of machinery would not exceed \$100,000.

Mebane, N. C.—To vote on issuing bonds for water works and sewerage system town considering election.

Raleigh, N. C.—For gravity line between pumping station and impounding reservoir it is reported city will lay about 5,000 ft. of 18-in. c. i. pipe. R. B. Seawell, Commr. Pub. Wks.

Dickinson, N. D.—City will extend water mains and sewer system. Mayor, Alf. White.

Bluffton, O.—Village voted to sell \$35,000 in bonds for improvement for water and light plants. If the vote stands Allen county's road improvement program, which embraced five miles of paving this summer, is indefinitely postponed. So high is Bluffton's tax rate that the county commrs. cannot legally issue road bonds if the issue vetoed stands.

Canton, O.—Mayor Stolberg's estimate on the cost of installing low lift pumps and a distribution basin in the water works plant; a 2,000,000-gal. basin and centrifugal pumps, \$59,858, who based the estimate on figures prepared by Waterworks Engr. Geo. Reese. Cost of the same basin with reciprocating pumps he put at \$30,215. The basin proposed would be put under the roadway south of the main pumping station. The improvement would relieve the strain upon the big Tod pump which now not only lifts the water but also distributes the water into the mains.

Canton, O.—Service Director Starrett was granted permission to receive bids and award the contracts for a quantity of supplies in the waterworks department, including meters for houses and factories, the purchase of which was recently authorized by council; also authorized to let the contract for drilling about 8 wells in the southwest section of the city to replenish the shallow water well supply in that district.

Greenwich, O.—Bids received April 6, \$5,000 water works improvement bonds. Village Clerk, F. H. Daniels.

Lima, O.—\$75,000 water works improvement bonds sold by city.

Middletown, O.—For improving water works system bond of \$20,000 will be sold Mar. 30. Louis T. Nein, City Aud.

New Berlin, O.—See "Sewerage."

Sidney, O.—For water main extension, city plans to purchase 80 tons c. i. pipe. G. A. Hatfield, supt.

Faxon, Okla.—Water works \$8,500 bonds carried.

Enid, Okla.—To vote on issuing \$50,000 bonds to be used for waterworks, election probably will be held in May. F. W. Brooks, Supt.

Bethlehem, Pa.—Reservoir cost \$250,000. Ross Common Water Co., of Ross Common, plans construction of 300,000-gal. capacity.

Erie, Pa.—Water commissioners engaged G. Wesley Stickle, Palace building, to prepare plans, specifications and cost estimates of the office building the board proposes to erect at Seventh and French streets. Bids probably will be opened in April.

Kittanning, Pa.—City considering construction of water works. H. J. Walter, chairman of council.

Philadelphia, Pa.—On improvements for the water system \$500,000 will be spent.

New Berry, S. C.—Bids received Mar. 20 for refunding water and lighting bonds, \$30,000.

Centerville, Tenn.—From report construction of waterworks contemplated. J. F. Harner, Mayor.

Iowa Park, Tex.—Town is planning a municipal water system to cost \$15,000.

Pleasanton, Tex.—For construction of adequate waterworks town voted \$20,000 bonds.

Pleasanton, Tex.—The question of issuing \$20,000 water works bonds carried.

Mesquite, Tex.—Water works \$12,000 bonds defeated by citizens.

Altavista, Va.—The First Natl. Bank of Altavista was the successful bidder for water, sewer and street improve-

ment bonds to the amount of \$16,000. W. S. Corbin, Town Clk.

Kirkland, Wash.—D. G. Sutherland, town clerk, reports the council has passed an ordinance providing for the improvement of Lake Av., Market St. and Bond St. by laying water mains.

Olympia, Wash.—Councilman Forstell has suggested to the council that a steamer should be bought for the fire department for the protection of the entire city. Councilman Massmore also suggested that the building of a new reservoir on an elevation near the present storage tanks would be profitable.

Hudson, Wyo.—Town Council passed resolution authorizing the issuance of \$30,000 water works system bonds.

Trail, B. C.—A. L. McCulloch, of Nelson, consulting engineer, has completed plans and specifications for the proposed Trail water supply and sewer system.

Barton Twp., Ont.—The Twp. Council will erect water tanks in the southeast section of the twp., and water will be supplied by the city of Hamilton. Clk., A. G. E. Bryant.

Bothwell, Ont.—Town Council considering erecting a \$5,000 water works system, and plans to buy one Diesel oil engine and motor-driven pump; also build a brick pumping station to cost \$1,000. No tenders will be called. Town Clerk, W. H. Bradley.

Niagara Falls, Ont.—See "Sewerage."

Pointe Claire, Que.—Plans are being drawn for filtration plant. Engr. R. S. and W. S. Lea, 10 Cathcart St., Montreal.

Sherbrooke, Que.—For approximately 7,000 ft. of galvanized iron pipe, from 1-in. to 1½-in., together with fittings, valves from ½ in. to 3 in.; 10 tons pig lead, lead wool, packings, etc. City Council is receiving tenders. Purchasing Agent, H. C. King.

BIDS RECEIVED AND CONTRACTS AWARDED.

(*Indicates Contracts Awarded.)

Baltimore, Md.—Bd. of Prison Control let for the erection of a steel water tank to hold 100,000 gallons; *Pittsburgh & Des Moines Steel Co., at \$7,685. Plans were made by R. B. Morse, sanitary engineer of the State Board of Health.

New Bedford, Mass.—On recommendation of Wm. F. Williams, consulting engineer, the Bd. of Aldermen for a 12-in. centrifugal pump and an electric motor for the Clarks' point pumping station; *Lawrence Pump & Engine Co.; also for the electrical apparatus required, *Briggs Electrical Co. for \$850 on account of the fact that Cutler-Hammer apparatus was specified, and he considered it worth the difference in price, \$50, a bid having been submitted by Potter & Searle of Fall River on General Electric apparatus.

Sumrall, Miss.—For materials, machinery and construction of a water works system, bids received as follows: Jones Construction Co., Jackson, Miss., 18c. per ton for laying pipe; Fairbanks Morse, New Orleans, La., 50 h.p. and 25 h.p. engine and pump for \$9,000; Dixie Supply Co., New Orleans, La., 6-in. c. i. pipe, \$44 per ton.

Lima, O.—Eight bidders submitted proposals to Service Director Metheny to furnish the city \$35,000 worth of c. i. water pipe, fittings, lead service pipe and fittings, and lead to be used in laying water mains the coming summer. Tabulation of the bids not completed. Bids for lead ranged from \$194 to \$220 a ton. Bidders: Good Tool & Supply Co., Lima; Plumbers Supply Co., Toledo; J. B. Clow & Sons, Chicago; United Lead Co., Cincinnati; H. Mueller Mfg. Co., Decatur, Ill.; Hammond-Bryd Iron Co., Chicago; United Brass Mfg. Co., Cleveland; and the Knapp Supply Co., Union City, Ind.

Sapulpa, Okla.—*Geo. Kodane at \$6,839.50, for 2,000,000-gal. dam at Euche Creek, by City Commrs.

Charleroi, Pa.—Heine Boiler Co., Phoenixville, Pa., for new water tube boilers for the main pumping station of the Tri Cities Water Co.

Chester, Pa.—*Hughes-Toukrod Co., Commonwealth Building, Philadelphia, for construction of filter plant at \$60,000.

St. John, Wash.—*C. H. Green Co., of Spokane, for construction of proposed water system.

Barrie, Ont.—Town Council, *Turbine Equipment Co., Ltd., Toronto, for a 1½-million imperial gallons a day De Laval single-stage centrifugal pump, to operate against 87 lbs. pressure and direct-connected to 100 h.p. electric motor.

Lindsay, Ont.—*Turbine Equipment

Co., Ltd., Toronto for one De Laval 2-stage pump, having a capacity of 1½ million imperial gallons a day for domestic requirements, and 1½ million imperial gallons a day for fire requirements. A vertical high speed gasoline engine will be connected by clutch to one side of the pump, and the electric motor on the other. Price, \$8,000, including installation.

Port Colborne, Ont.—By Town Council. Turbine Equipment Co., Ltd., Toronto, by the International Nickel Co., for one De Laval 130 h.p. steam turbine-driven centrifugal underwriter fire pump.

MISCELLANEOUS.

Seward, Alaska.—Reported it is planned to issue bonds in the sum of \$21,800,000 for the completion of the Alaska Railway project, in lieu of regular appropriation for the purpose by Congress.

Indianapolis, Ind.—Ordinance introduced authorizing a temporary loan of \$45,000 for the Board of Public Health.

Indianapolis, Ind.—Bids received Mar. 10, 1917, at 12 m., by City Controller, for sale, \$4,118.18 park improvement bonds, 6 per cent. R. H. Sullivan, City Contr.

Dubuque, Ia.—Some members of the city council are looking forward to a new city hall during the course of the next two or three years.

Baton Rouge, La.—The Hibernia Bank & Trust Co. of New Orleans was the successful bidder at the sale of \$400,000 worth of State penitentiary notes, premium of \$4,200.

New Bedford, Mass.—The city council committee on wharves voted to recommend to the city council that authority be given to sell about 16 rods of land owned by the city on Front street, a part of the wharf holdings, at a price not less than \$250 a rod, the sale to be at public auction, and the purchaser to agree to spend \$25,000 on a building.

Pittsfield, Mass.—Board of works votes to improve municipal hall grounds.

Marquette, Mich.—City will purchase a new sprinkling wagon and tar spreading outfit.

Carthage, Mo.—Civic League is getting information on subject of garbage removal for city.

Joplin, Mo.—See "Sewerage."

St. Joseph, Mo.—See "Sewerage."

Atlantic City, N. J.—City Comrs. provides \$10,000 for the laying out and opening of a public park along the beach front.

Atlantic, N. J.—Comm. passed ordinance for Harbor improvements. City will immediately begin active operations on the plans prepared by City Engr. Hackney.

Hackensack, N. J.—Police Committee was authorized to install automatic cycle at a cost not exceeding \$225.

Longport, N. J.—Bids for construction of 6,000 lin. ft. of reinforced concrete seawall to protect the Borough from the ravages of storms are offered. It is understood that the specifications call for filling and grading in addition to the construction of the wall.

Newark, N. J.—Bd. of Freeholders' road committee approved for the construction of a new drain in Bloomfield Ave. at the Glen Ridge-Montclair line; cost, \$1,500, and will run under the property of the Lackawanna R. R. Co.

Ocean City, N. J.—The election here favored issuing improvement bonds of \$38,000. Harry A. Morris, city clerk.

Passaic, N. J.—Anxious to get action at once on the deepening of the Passaic River from Newark to this city at least, and possibly to Paterson, through the efforts of that city, Mayor George N. Seger has written to B. F. Cresson, Jr., chief engineer of the New Jersey Harbor Commission, for information regarding plans for the development of the river front in this city.

West New York, N. J.—Town North Hudson Sect. Hudson County plan joint garbage incinerator. Address J. B. Frudenberger, West New York.

Amityville, N. Y.—An election will be held March 20 to vote \$22,000 bond issue for village hall.

Brooklyn, N. Y.—Bd. of Aldermen approved three sites for garbage incinerators in Queens, Flushing, Jamaica and Avenel; each to cost \$100,000.

Brooklyn, N. Y.—Residents in the vicinity of Forest Park are making every effort to aid the approval of the application of Park Commissioner Weiler of Queens County for an appropriation of \$65,000 for the needs of his department and including \$7,500 for water for drinking purposes and fire protection in Forest Park, and \$7,500 for the development of property, formerly used as a portion of the golf links, as a large

playground. Of the appropriation, \$50,000 is asked for the construction of "the most necessary portions of a complete service building for the use of the Department of Parks, Borough of Queens."

Brooklyn, N. Y.—Public service commission estimates expense of the proposed Utica Ave. rapid transit line elevated railroad at \$5,210,536.

Grand Forks, N. D.—County Ditch No. 107 was established by the comrs.; will be constructed during the coming summer; will drain portions of the twps. of Bygland and Fisher and will empty into a coulee that flows into the Red River near East Grand Forks; will be 3 miles in length; estimated cost of \$4,500.

Kenmore, O.—Village Clerk W. W. Shank will receive bids March 17 on \$40,000 Municipal Building coupon bonds.

Erie, Pa.—Board of Commerce to donate cars to Hamot and St. Vincent's Hospitals. A campaign to raise \$10,000 will be started.

BIDS RECEIVED AND CONTRACTS AWARDED.

(*Indicates Contracts Awarded.)

Torrington, Conn.—Bids for collecting garbage were submitted to the borough by Supt. G. F. Farnham. H. M. Hudak, 81 East Main St., an estimate of \$4,695; Ravaloli Paolo, \$6,820; Peter Ranieri & Co., \$7,250; W. J. Lee, \$5,150, and S. Sterling, \$2,100 for one-half the borough only. The committee, Burgess, Castle and Baldwin, will confer with the superintendent on these figures and report at the next meeting.

Flint, Mich.—Tabulations of bids for the construction of the Leith St. subway, for which material was ordered some time ago: Benjamin Douglas, Ann Arbor, matt construction, \$69,045; pile construction, \$66,109, and Hagerdorn Contracting Co., of Indianapolis, matt construction, \$59,107.50; pile construction, \$58,913. Referred to the council as a committee of the whole for consideration.

Brooklyn, N. Y.—Thomas Crimmins at \$165,400 for the relocation of the trolley tracks on New Utrecht avenue. The tracks to be relaid are two and a third miles long and run beneath the New Utrecht avenue "L" structure. Public Service Commission.

TOO LATE FOR CLASSIFICATION

BIDS ASKED FOR

STATE	CITY	REC'D UNTIL	NATURE OF WORK	ADDRESS INQUIRIES TO
STREETS AND ROADS.				
Ore.	Portland	11 a.m., Mar. 19.	Improving St. Helen's road.	Co. Comr.
N. J.	Jersey City	3 p.m., Mar. 20.	Repairing sidewalks on Clay St. bridge.	F. P. Boland, Chrmn. Board of Chosen Freeholders.
N. J.	Irvington	8 p.m., Mar. 21.	30,000 gallons of road oil.	I. J. Casey, Jr., Town Engr.
Mich.	Port Huron	10.30 a.m., Mar. 26.	Concrete, bituminous macadam or macadam roads, about 3 miles	D. D. Worcester, Road Mgr.
Minn.	St. Paul	10.30 a.m., Mar. 26.	4,000 cubic yds. of sand, 900 cu. yds. of stone, 600 tons asphaltic cement, 100 tons Trinidad asphalt and 600 tons limestone dust	H. W. Austin, Pur. Agt.
Wash.	Everett	Mar. 26.	Grading and paving roads	Mae Weatherbee, Co. Aud.
N. J.	Newark	3.30 p.m., Mar. 29.	Paving 6 streets, with bitulithic	M. R. Sherrard, Chief Engr.
Ill.	Benton	April 2.	Concrete pavements, cost \$70,000	Putnam & Mautz, Engrs.
Pa.	Mahanoy City	7.30 p.m., Apr. 5.	20,000 sq. yds. pavement	R. J. Griffith, Chrmn Street Committee.
SEWERAGE.				
Mass.	Boston	Noon, Mar. 16.	Constructing pipe sewer and drains.	E. F. Murphy, Comr. Pub. Wks.
Minn.	St. Paul	10.30 a.m., Mar. 26.	Sewers in several streets	H. W. Austin, Pur. Agt.
MISCELLANEOUS.				
Mass.	Boston	Noon, Mar. 16.	Furnishing combination street sprinkler, flushing and oil spreading motor trucks; watering carts.	E. F. Murphy, Comr. of Pub. Works.
N. C.	Asheville	Mar. 19.	Furnishing motor truck	City Clerk.

STREETS AND ROADS.

Birmingham, Ala.—Road improvement projects in Lauderdale and Russell counties involving expenditure of \$20,000 of the federal appropriation and \$20,000 furnished by state aid and county subscriptions were approved by the state highway commission. Lauderdale road will extend from Florence toward Huntsville. Russell road will be a portion of the Montgomery-Columbus highway. Each is a part of the trunk system. The commission is facing a problem in ob-

taining funds sufficient to administer the government appropriation of \$300,000.

Tucson, Ariz.—City Engineer A. C. Dietrich instructed to make an estimate of the cost for the paving of Sixth Ave. from Third Ave. to Congress St. with 2-in. bitulithic paving on a 4-in. bitumen and concrete base. Paving of Sixth Ave. from Third St. to the Speedway with 1½-in. bitulithic paving on 3½-in. concrete and bitumen base, and for the paving of Tenth St. from the alley between Fifth and Sixth Ave. to Sixth Ave., with

2-in. bitulithic paving on a 4-in. concrete and bitumen base.

Jackson, Cal.—Amador Co. Supervisors have passed a resolution that the expense of surveying the state highway lateral from Herold to Jackson be paid out of the \$5,000 set aside by the county to repair and construct the road.

Marysville, Cal.—A proposal to bond Yuba county in the sum of \$500,000 is to be discussed, also the advisability of a survey and classification of lands of the county as a basis for an increased assessment roll.

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Municipal Journal, 50 Union Square, New York

San Jose, Cal.—The petition of Alex Katz and others asking the board to widen the Penetencia road from Capitol Ave. and running thence to the westerly line of the city reservation.

Tampa, Fla.—Resolution introduced by the street committee ordering the paving of Amelia Ave. from Florida Ave. to Ola Ave., Keys from Highland to Ola, and West from Ola to Massachusetts with asphalt block, adopted.

Tuscola, Ill.—Board of supervisors decided on the location of the hard roads to be constructed under the state aid plan this year. One mile beginning at the southwest corner of the city of Newman running west, extending the present string of brick paved road running east from the southeast corner of the city of Tuscola.

Annapolis, Md.—County commissioners considering road petitions and additional highway.

Merrimac, Mass.—Appropriations voted highway and bridges, \$1,500; special for Rockes bridge, \$666.66; sidewalks and crossings, \$200; water department, municipal use, \$2,421.

Merrimac, Mass.—An appropriation of \$1,500 to continue the work on Broad St., provided the state and county contribute a like amount was decided.

Rockland, Mass.—It was voted to appropriate \$3,000 for extending the macadam on West Water St. to the Abington line, a distance of 900 ft.

Great Falls, Mont.—Report of committee adopted for a special improvement district for concrete paving in Second alley north between 13th and 14th Sts.

Beatrice, Neb.—At a special election here intersection paving bonds to the amount of \$40,000 carried.

Hackensack, N. J.—The road committee was authorized to advertise for bids for culverts on Midland Ave., in Garfield.

South Orange, N. J.—Township passed ordinance for the straightening, opening and widening of that part of Baker St., a public highway in the county of Essex, between Dunnell road and Valley St.

Rahway, N. J.—Council decides to repave streets surrounding the park bounded by Cherry, Broad and Campbell Sts.

Hamilton, O.—Council adopted ordinance calling for closed paving specifications for High St.

Lima, O.—Allen county will get the road improvements planned by the commissioners and Bluffton will get her new street lighting system, despite the fact that Bluffton's high tax rate for a time threatened to prevent the good roads program going into effect.

Ironton, O.—Board of county commissioners passed a resolution in line with the request of the Chamber of Commerce committee appropriating a sum not to exceed \$5,000 dollars for repairs to Adams lane road. The road is to be 16 feet wide and will very likely be constructed of concrete.

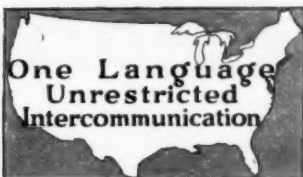
Dallas, Tex.—Lemmon Ave., Cedar Springs road and Fairmount or Maple Ave., crossing the Missouri, Kansas & Texas Railway tracks, will be lowered from 7 to 10 ft., with the lowered grade extending back from 200 to 400 ft. east and west from the tracks, the plans for the track raising and grade crossing abolition work in North Dallas by the Katy railroad, plans have been filed with the city engineer. The improvement work will cost \$267,000. The track will be raised for a distance of 1 1/2 mile. City Engineer Hal Moseley will examine the plans and make a report to the city commission through Street Commissioner Otto H. Lang within the next ten days.

Covington, Va.—Election April 9th for the purpose of a bond issue of \$150,000 for the purpose of paving the streets of the town.

Olympia, Wash.—The state highway budget appropriation, apportioning \$1,121,052 for construction and maintenance of state roads, including \$492,500 for the Mount Tacoma road and \$12,000 for bridging the Nisqually River on the Pacific highway, passed the senate just as it came from the house. The bill now goes to the governor.

Seattle, Wash.—Plans received from city engineer for Fauntleroy Ave. et al., grading, etc., earth work 34,500 cu. yds.; estimated cost, \$13,500.

Superior, Wis.—County board reconsiders the question of submitting the \$500,000 bond issue for roads to vote of the citizens at April election.



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BIDS RECEIVED AND CONTRACTS AWARDED.

(*Indicates Contracts Awarded.)

Manhattan Beach, Cal.—For constructing 27 blocks of The Strand was awarded Feb. 28 to *Redondo Const. Co., at \$55,952.03; reinforced 3 1/4-in. concrete walk, 135 sq. ft.; 12c; redwood header, 90c; curb F, \$1 ft.; curb G, \$1.50 ft.; curb H, \$18 yd.; curb H, \$19 cu. yd.; curb J, \$90; light posts No. 13, \$105; light posts, Nos. 96 and 98, \$4 ft.; balustrade, \$12 cu. yd.; wall C, \$12 yd.; wall D, \$1 ft.; wall E, \$23 yd.; wall and pavement combined, A-A and B-B, 50c; 8-in. clay pipe, 80c; 12-in. clay pipe, 50c; 6-in. clay pipe, \$300; 27-in. corrugated iron pipe and headwall; \$2.90 12-in. corrugated iron pipe; \$18.20 manholes each; \$10 each

catch basins; \$270.35 storm drain No. 94; \$600 storm drain No. 92; 22c. sq. ft. concrete steps, \$20 cu. yd. reinforced walls; 15c. platform sq. ft.; \$4.774 for sea wall, etc. Bidders: Tyron & Brain, \$57,736.15; J. S. Miller, \$57,976.42; Municipal Imp. Co., \$58,057.84; Jas. Kennedy, \$59,143.11; Highway Const. Co., \$63,616.23; Mismar & Rice, \$64,482.96; G. Gabrielson, \$75,538.70. M. M. Murray, City Engr.

Columbus, Kan.—*Watts & Amerman, Lawrence, Kan., bids opened Mar. 5, 3-in. vertical F. Brk. A. F., 11,192 sq. yds. concrete foundations 4 in. thick, 2,400 cu. yds. dirt excav., \$1.78; paving per sq. yd., 48c.; excav., total \$25,730. F. H. Hawkins, City Clk.

Great Falls, Mont.—Council to *Roland J. White for the grading of Central Ave., between 15th and 28th Sts.

\$8,096.74. Other bids: Nilson & Smith, \$8,834.05; Ross & McCabe, \$9,498.46.

Rahway, N. J.—For furnishing 50,000 gallons of asphalt road binder, *Standard Oil Co., upon recommendation of the street committee.

Rahway, N. J.—Bids for various grades of crushed stone and gravel received, including the Delaware River Quarry & Construction Co., Avery & McGee, Henry Steers Sand & Gravel Co., Middle Valley Trap Rock Co., General Crushed Stone Co., and F. R. Upton. Were referred to the street committee for tabulation, examination and report.

Dehance, O.—Service Director Myers opened bids for paving of Jackson, Juliet, First and Third Sts from contractors of Toledo, Lima, Fostoria, Findlay and other cities.

Philadelphia, Pa.—Department of Public Works, Bureau of Highways, opened bids March 6 on 40,833 cu. yds. grading, average price 0.62 per cu. yd. Low Bidders: Tony E. Madonna, 2125 W. Indiana Ave.; Phil. Smart, 7200 Elmwood Ave.; Mat. W. Dougherty, 2134 S. Broad St.; T. F. Reilly, 50th and City Ave.; Alex. McElhenney, 1230 S. 28th St.; H. C. Ambler, 3717 Old York road; R. B. Wenner, 2006 Finance Bldg.; T. L. Flanagan, 1330 E. Montgomery Ave.; total amount of low bids, \$23,391.39. Wm. H. Connell, Chief of Bureau; Geo. E. Datesman, Director.

Mitchell, S. D.—Bids opened March 5th for paving, asphaltic concrete 16,314 sq. yds., concrete foundations 5 ins. thick, *C. H. Atkinson Paving Co., Watertown, S. D., \$1.77 paving per sq. yd.; excav., sq. yd., 50 and 60 cts.; total, \$30,853.18. Bidders: Western Construction Co., Sioux City, Ia., paving per sq. yd., \$1.68½; excav., sq. yd., 50 cts.; Pioneer Bridge Co., Mitchell, paving, per sq. yd., \$1.72; excav., sq. yd., 55 cts.

Ashland, Wis.—Peppard & Fulton, to grade and surface eight miles of road in Bayfield county for \$36,000.

SEWERAGE.

Fresno, Cal.—City council authorized a call for bids on the construction of a new storm drainage system to cost about \$150,000. The money will come from the recent bond issue of \$500,000. The cost of sanitary sewers now being built will be about \$332,000. Plans and specifications of the storm sewers were adopted as presented by B. E. Cronkite, the city's sewer engineer. The council will demand that storm sewers be laid at once on Inyo St., between Van Ness Ave. and L St. Pavement is to be laid there soon.

Rockland, Mass.—Sewerage system to be installed. Engr., Worthington of Deham. Estimated cost is \$225,000. Will cover 10 miles of the congested part of the town with a disposal plant off Concord St.

Gladstone, Mich.—Pearse & Greeley, hydraulic and sanitary engineers, 64 W. Randolph St., Chicago, Ill., informs us plans and specifications for main sewers will be of vitrified tile or concrete pipe, and the sewage treatment plant, settling tanks chlorination; estimated cost at \$14,000.

Minneapolis, Minn.—Trunk line and lateral sewers estimated to cost \$487,000 were recommended for installation by the council sewers committee. The necessary bond issue is still to be ratified by the legislature, two of which will cost \$150,000, ordered laid in the 13th Ward. Will serve the Lynnhurst and Linden Hills districts and Nicollet Ave. from 42d St. and 50th Sts. Other extensions were: Oak St., s. e. from 7th to Elm Sts., \$44,000; 42d Ave., n. from Penn to Thomas Aves, \$12,000; 38th Ave., n. from Humbolt to Penn Aves., \$18,000; 29th Ave., n. e. from Ulysses to Garfield Sts., \$5,000; Winter St., n. e. from Ulysses to Arthur Sts., \$34,000, and Arthur St., n. e. from Winter St. to 19th Ave., \$18,247. City will pay approximately \$265,000 of the estimated cost of \$281,000 for trunk line sewers, while its share of laterals ordered will be about \$88,000. The Linden Hills extension from Dupont Ave. s. to 44th St., and Lake Harriet Blvd. will cost \$165,000. The city will pay the entire amount. Action on the proposed 31st Ave., n. e. trunk line to the river, estimated to cost \$52,000, was defeated.

Princeton, N. J.—A sewer expert will be called in by the borough engineer to investigate the plan and cost of placing a septic tank in the northwest sewer field.

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With the **Kuhlman Sewer Cleaning Machine** you can clean your sewers quickly and economically. No wet disagreeable work, because all work is done from the surface. The expansion buckets will bring up anything, be it sand, mud, gravel, rags, brickbats or other obstructions. The jaws close automatically. The Manhole Guide Jack guides the buckets out of the sewer tile and up through the manhole to the surface.

Our Water Motor Sewer Cleaner is a marvel which can be had at a nominal price.

Sewer Rods that cannot come uncoupled in a sewer and will float at 12½c. per foot.

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CHAMPION POTATO MACHINERY CO.
332 Sheffield Ave. Hammond, Ind.

BIDS RECEIVED AND CONTRACTS AWARDED.

(*Indicates Contracts Awarded.)

Michigan City, Ind.—*Peter Michaely, sewer, Claire St., 2 blocks 10-in. tile. Engr. E. G. Dunn, Jr., Court House. A. Spycholski, City Clk.

Eldon, Ia.—*Hobness Bros., Ottumwa, sewer at \$3,000. Engr., H. E. Cook, Court House, Ottumwa, Ia. H. Ritz, City Clk., Eldon.

West Burlington, Ia.—For sanitary storm sewer for West Burlington, *Des Moines Bridge & Iron Co., Des Moines, Ia. Stevens & Stevens, Engr., 222 Commerce Bldg., Kansas City, Mo.

Cottonwood Falls, Kan.—*Munn-Reise Constr. Co., 320 N. 15th St., Kansas City, Kan., ditch work, drainage district No. 2, 77,000 yds. excavation. Engr., H. B. Walker, Manhattan, Kan. E. A. Stout, Secy. Board of Supervisors.

Larned, Kan.—*McCoy & Taylor, Larned, sewer improvement, \$25,000. Engrs. Black & Veatch, 507 Inter-State Bldg., Kansas City, Mo. L. D. Burgess, City Clerk.

WATER SUPPLY.

Merrimac, Mass.—See "Streets and Roads."

Mason, Mich.—Citizens are considerably agitated over the electric light and water works situation. The plant as it now stands is running behind daily. Three propositions are up for consideration. To sell to the Consumers' Power Company, to build a new plant, and equip it with modern machinery or to remodel and purchase new machinery for the old plant. To settle the first question a special election has been called for March 19.

Gold Bar, Wash.—Town council has passed a resolution to submit the proposition of whether the town should purchase the local water and lighting system to the voters. The public utilities committee was instructed to arrange for disposition of the bonds in case the vote was favorable.

BIDS RECEIVED AND CONTRACTS AWARDED.

(*Indicates contracts awarded.)

Dallas, Tex.—Board of City Commissioners for \$13,800 worth of cast iron pipe, 200 tons of six-inch pipe to *United States Cast Iron and Foundry Co., at \$45 per ton for 100 tons of 4-in. pipe to the *American Cast Iron Co., at \$48 per ton. Bids for approximately \$12,000 worth of "goosenecks," which are lead connections between a water main and the service pipe, were opened.

MISCELLANEOUS.

Chicago, Ill.—Aldermen, Health department and Women's City Club began an active campaign to place before the voters April 3 and obtain approval of bond issue aggregating \$2,200,000, of which \$1,750,000 is for health purposes. The issues were approved by city council on finance, and will be submitted to the council. For incinerators and other waste disposal equipment, \$1,000,000; two additional wings at the new contagious hospital, \$750,000; enlarging the school for boys at Gage farm, \$250,000; improving the 51st Street beach, \$100,000; improving the 79th Street beach, \$100,000.

Springfield, Ill.—City may vote Apr. 3 on a \$60,000 bond issue, to be used in providing a system of conduits for placing underground wires in the business district.

Fort Wayne, Ind.—City has need of 3 more motor trucks for the collection of garbage, is the statement of Mayor Hosey.

Indianapolis, Ind.—The Fletcher American National Bank submitted to Reginald H. Sullivan, city controller, the high bid for \$4,118.18 worth of Barrett law bonds issued on improvements in the east park district.

Washington, D. C.—Bureau of Foreign and Domestic Commerce (Department of Commerce)—A manufacturer in Spain is in the market for colors used in the manufacture of hydraulic cement mosaic. Quotations should be made c. i. f. destination. The material should be packed in small barrels. Correspondence should be in French or Spanish. References. Refer to Opportunity No. 23936.

Washington, D. C.—Bureau of Foreign and Domestic Commerce (Department of Commerce)—A firm in Spain desires to purchase sulphate of copper, 98/99 per cent. Quotations should be made c. i. f. destination. Cash will be paid. Goods should be put up in barrels. Correspondence may be in English. Reference. Refer to Opportunity No. 23930.

Sault Ste. Marie, Mich.—Com. Council decided to advertise for bids on a modern incinerator plant.

Duluth, Minn.—St. Louis county sold \$160,000 worth of ditch bonds to the Northern Natl. Bank, a premium of \$4,640.

Mt. Vernon, N. Y.—Legislative bills which if passed in Albany and signed by the Governor will raise city's budget capacity for city expenses from \$400,000 to \$600,000, the fire dept.'s appropriation from \$40,000 to \$80,000 and the police dept.'s appropriation from \$80,000 to \$100,000 were approved by the Common Council.

Johnstown, Pa.—See "Sewerage."

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AGENCIES
Northern Electric Co., Ltd., Montreal, Can.
General Fire Appliances Co., Ltd., Johannesburg, S. Af.
Colonial Trading Co., Ancon, Canal Zone, Panama.

F. F. Danforth, 1060 Calle Rioja, Rosario de Santa Fe, Argentine Republic.
Trafano de Medeiros & Co., Rio de Janeiro, Brazil
C. Lorens Co., Berlin, Germany.

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Finding the seat of the fire and confining it, is best effected by efficient fire forces having a sufficient supply of reliable and substantial hose such as manufactured by

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COTTON RUBBER LINED FIRE HOSE Wax and Para Gum Treated

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FABRIC FIRE HOSE MANUFACTURING CO.
Cor. Duane and Church Streets
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ESTABLISHED 1885

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S.F. BOWSER & CO. INC. Fort Wayne, Ind.

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AMERICAN CAR SPRINKLER CO.
WORCESTER, MASS.

WHAT WOULD BE YOUR JUDGMENT?

During 1916 the American-LaFrance Fire Engine Co., Inc., closed contracts for the following

Pumping Cars.....	253
Combination Cars	127
Service Trucks	32
Aerial Trucks	16
Tractors	27

Total 455

50% of these contracts were repeat orders.

All other manufacturers of motor fire apparatus, including some who have since discontinued business and therefore could be properly excluded from such a classification, show total sales during 1916 of 384 pieces of all descriptions.

Are not these figures conclusive evidence that American-LaFrance apparatus must be distinctly superior?

AMERICAN-LAFRANCE FIRE ENGINE COMPANY, INC.

ELMIRA, NEW YORK

Members of National Automobile Chamber of Commerce Licensed under the Dyer Patents

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NOTICE TO CONTRACTORS, STATE OF NEW YORK, Office of the State Commission of Highways, Albany, N. Y.—Pursuant to the provisions of Chapter 30, Laws of 1909, as amended by Chapter 646, Laws of 1911, and Chapter 80, Laws of 1913, sealed proposals will be received by the undersigned for furnishing and delivering bituminous materials f.o.b. cars at destination, for use by the State Highway Department in the maintenance and repair of improved state and county highways in all of the counties of the State unless otherwise specified, at the office of the State Commission of Highways, 55 Lancaster Street, Albany, N. Y., at one o'clock p. m., Monday, the 19th day of March, 1917, for the following contracts:

B. M. Contract No. 1—Bituminous Material A—Binder.

B. M. Contract No. 2—Bituminous Material A—L. C. O.

B. M. Contract No. 3—Bituminous Material T—Binder and Hot Application.

B. M. Contract No. 4—Bituminous Material T—Cold Application in tank cars.

B. M. Contract No. 5—Bituminous Material Cold Patch Asphaltic Emulsion in Divisions Nos. 1, 2 and 4.

Sealed proposals will also be received by the undersigned at their office, 55 Lancaster Street, Albany, N. Y., on Tuesday, the 20th day of March, 1917, for the following contracts:

B. M. Contract No. 6—Bituminous Material A—L. H. O.

B. M. Contract No. 7—Bituminous Material T—Cold Application in barrels.

B. M. Contract No. 8—Bituminous Material Cold Patch Asphaltic Emulsion in Divisions Nos. 3, 5, 6, 7, 8 and 9.

All proposals, except contracts Nos. 5 and 8, will be for furnishing the specified material at any railroad delivery point within the State. Proposals for contracts Nos. 5 and 8 will be for furnishing the specified material at any railroad point within the counties comprising the Divisions named in the proposal.

Tables showing approximate quantities and railroad delivery point, specifications and proposals may be obtained at the office of the State Commission of Highways at Albany, N. Y.

Each proposal must be accompanied by cash or a certified check payable to the order of the State Commission of Highways for an amount equal to at least five per centum of the amount of the proposal which such cash or check accompanies. This cash or check will be held by the Commission until the contract is executed and the bond is filed.

The successful bidder on each proposal will be required to give a bond for 50 per centum of the amount of the contract, such bond to be executed by a Surety Company to be approved by the Commission. The bond is for the purpose of insuring the delivering of the bituminous material as called for by the Commission.

The right is reserved to reject any or all bids.

EDWIN DUFFEY,
Commissioner.
I. J. MORRIS,
Secretary.

Laying Cast Iron Water Pipe.

Sealed proposals will be received by the Water Works Department of the City of Ann Arbor, Michigan, until 12 o'clock noon, Central Standard Time, Monday, March 26, 1917, for laying approximately 21,500 linear feet of 16-inch and 500 linear feet of 12-inch cast iron water main in the City of Ann Arbor, Michigan.

Forms of proposal, specifications, contract and plans may be seen at the office of the Water Works Department, City Hall, Ann Arbor, Michigan, or may be obtained from the Engineer upon deposit of \$10.00, the amount of which will be returned upon return of specifications, plans, etc.

The Water Works Department reserves the right to reject any or all proposals and to accept the proposal which may appear to the best advantage for the Water Works Department.

WATER WORKS DEPARTMENT,
By Geo. S. Vandawarker, Manager.
GARDNER S. WILLIAMS, Consulting Engineer,
Cornwell Bldg., Ann Arbor, Michigan.

Earth Filling

SEALED PROPOSALS for earth filling for roadway will be received by the Board of Public Works of the City of Elizabeth, New Jersey, at the City Hall, on Thursday, March 29, 1917, at 2 o'clock P. M.

Approximate quantity, 20,000 cubic yards of earth filling, place measurement.

This proposed roadway crosses the Elizabeth River and can be reached by scows from Staten Island Sound.

A Surety Bond or certified check in the sum of ten (10) per cent. of the total amount bid must accompany each proposal.

Plans and Specifications can be obtained by applying in person at the office of the City Engineer.

The said City of Elizabeth reserves the right to reject any or all bids.

THOMAS E. COLLINS,
City Engineer.

Dated March 5, 1917.

TRANSITS AND LEVELS RENTED OR SOLD EASY TERMS

THE ENGINEERING AGENCY, Inc.
33 West Jackson St. Chicago

Macadam Roller

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FOR SALE Surveying Outfit

Consisting of a Gurley, Light Mountain Transit and tripod, poles, rod, steel tape, iron pins, etc., in perfect condition. Big bargain for immediate buyer. Address C. W. McMULLEN, Executor, Aurora, Indiana.

RAILS 50 MILES 60 LB.

A.S.E.E. Section with continuous bars.
Almost New Western Delivery
CARS, EQUIPMENT, PILING
ZELNICKER IN ST. LOUIS

Proposals for Road Oil.

Sealed proposals for furnishing the City of New Bedford with non-asphaltic road oil for 1917 will be received by the undersigned at the office of the Street Department, Municipal Building, New Bedford, Mass., until 12 o'clock noon, Tuesday, March 20th, at which time and place they will be publicly opened and read.

Specifications and proposal forms may be obtained on application at the above mentioned office.

The right is reserved to reject any or all bids.

W. P. HAMMERSLEY,
Superintendent of Streets.

March 10th, 1917.

WANTED

10 ton Macadam Roller for immediate delivery. Must be in good shape. Will pay cash if price is right.

Municipal Journal, Box 990.
50 Union Square, N. Y. City

TREASURY DEPARTMENT, Supervising Architect's Office, Washington, D. C., March 10, 1917.—Sealed proposals will be opened in this office at 3 P. M., April 23, 1917, for the construction of the United States post office at Berlin, N. H. Drawings and specifications may be obtained from the custodian of the site at Berlin, N. H., or at this office, in the discretion of the Supervising Architect. JAS. A. WETMORE, Acting Supervising Architect.

PROPOSAL ADS in Municipal Journal Bring Results